DOCUMENT RESUME

ED 120 122 95 SP 009 893

AUTHOR Smith, Fldon Cale
TITLE A Latitudinal Study of Pre-Service Instruction in Flanders' Interaction Analysis Categories.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
PUB DATE May 76
NOTE 116p.; Ed.D. Dissertation, Arizona State University

EDRS PRICE MF-$0.83 HC-$6.01 Plus Postage
DESCRIPTORS *Classroom Communication; *Classroom Observation Techniques; *Inservice Teacher Education; *Interaction; *Interaction Process Analysis; Preservice Education; Student Participation; Student Teachers; Teacher Behavior; *Teacher Response; Teaching Techniques; Verbal Communication
IDENTIFIERS *Flanders Interaction Analysis Categories

ABSTRACT

The purpose of the study was to determine whether differences in verbal interaction existed between study teachers and first, second, and third year teachers with preservice instruction in Flanders Interaction Analysis Categories (FIAC) and a comparison group without such instruction. (TIAC is a system of 10 categories which classifies verbal interaction in the classroom as either contributing to or interfering with student autonomy.) Preservice instruction in FIAC involved 13 hours of practice in recording interaction behaviors, constructing and interpreting matrices, and developing indirect teaching skills. The findings indicated a positive relationship exists between preservice instruction in FIAC and subsequent verbal interaction during student teaching and first, second, and third years of teaching experience. Few persistent trends could be identified demonstrating a consistent difference (either direct or indirect) continuing from student teaching through the third year of teaching experience. However, student teachers and first, second and third year teachers with preservice instruction in FIAC consistently utilized more modified indirect influence, and more extended use of student ideas. In contrast, the comparison group exhibited more direct teacher response to student talk (with the exception of second year teachers) and more student talk (with the exception of first year teachers). (CD)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED 120 122

SP

A LATITUDINAL STUDY OF PRE-SERVICE INSTRUCTION IN FLANDERS' INTERACTION ANALYSIS CATEGORIES

by

Eldon Cale Smith

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

MAR 1 8 1976

SP009 893

ARIZONA STATE UNIVERSITY

May 1976

A LATITUDINAL STUDY OF PRE-SERVICE INSTRUCTION

IN FLANDERS' INTERACTION ANALYSIS CATEGORIES

by

Eldon Cale Smith

has been approved

December 1975

APPROVED:

Wayne Parrish, Chairperson

Supervisory Committee

ACCEPTED:

Department Chairperson

Dean, Graduate College

PREFACE

The project presented herein was performed pursuant to a grant from the U.S. Office of Education, Department of Health, Education, and Welfare. The opinions expressed herein, however, do not necessarily reflect the position or policy of the U.S. Office of Education, and no official endorsement by the U.S. Office of Education should be inferred.

ACKNOWLEDGMENTS

I wish to express my thanks to the following persons:

To Dr. Rex Shelley for serving as the initial Project Director of the institutional research study at Peru State College, Peru, Nebraska. He was instrumental in developing the general guidelines of this research project and providing the opportunity for me to serve as the principal investigator.

To Dr. Neal S. Gomon, former President of Peru State College, for providing institutional support.

To Dr. Terry D. Cornell of EPIC, Tucson, Arizona for providing consultant services.

To Dr. Phil A. Cook, Dr. James E. Frasier, Dr. Nelson L. Haggerson, Dr. R. Craig Rover, and Dr. William S. Svoboda for their support and encouragement as members of my Doctoral Committee.

To Dr. H. Wayne Parrish for sharing his time and expertise during every stage of the research endeavor. I am especially grateful to Dr. Parrish for his leadership as Chairperson of my Doctoral Committee.

To my wife, Nadine, for her faithful devotion as wife, counselor, and typist.

TABLE OF CONTENTS

Page

LIST OF TABLES xii

LIST OF FIGURES xiv

Chapter

1. GENERAL NATURE AND PURPOSE OF THE STUDY 1

INTRODUCTION 1

STATEMENT OF THE PROBLEM 4

PURPOSE 4

NULL HYPOTHESES RELATING TO VARIOUS INDICES . . . 4

FIAC RATIOS 6

SIGNIFICANCE OF THE STUDY 7

ASSUMPTIONS OF THE STUDY 10

LIMITATIONS OF THE STUDY 10

DEFINITION OF TERMS 11

FIAC 11

Indirect Influence 11

Direct Influence 11

Pre-Service Instruction in FIAC 11

Latitudinal Study 12

Chapter Page

Comparison Group 12

ORGANIZATION OF THE STUDY 12

2. REVIEW OF THE LITERATURE 13

INTRODUCTION 13

EARLY EFFORTS IN INTERACTION ANALYSIS 13

THE DEVELOPMENT OF FIAC 18

APPLICATIONS OF FIAC 19

FIAC PRE-SERVICE INSTRUCTION 21

PRE-SERVICE FIAC FOLLOW-UP STUDIES 23

SUMMARY 26

3. RESEARCH, METHODS, AND PROCEDURES 27

INTRODUCTION 27

SELECTION OF GROUPS 27

Standard Selection Procedure 28

Standard Orientation Procedure 29

Selection of Subgroups A1, A2, and A3 30

Selection of Subgroups C1, C2, and C3 31

Selection of Subgroup A0 31

Selection of Subgroup C0 32

PRE-SERVICE INSTRUCTION IN FIAC 32

Orientation 33

Chapter Page

Skill Development and Interpretation 35

Achieving Closure and Expertise 37

Behavior Modification 37

FIAC INDICES 38

FIAC RATIOS 42

DATA COLLECTION 45

CODING PROCEDURES 46

STATISTICAL TREATMENT 47

SUMMARY 48

4. RESULTS OF THE STUDY 49

INTRODUCTION 49

NULL HYPOTHESES RELATING TO VARIOUS INDICES 49

Tabling of Data 51

Index (a) Student Talk 53

Index (b) Teacher Talk 54

Index (c) Content Cross 55

Index (d) Modified Indirect Influence 56

Index (e) Modified Direct Influence 57

Index (f) Extended Use of Student Ideas 58

Index (g) Extended Criticism 59

Index (h) Student Response to a Teacher Question 60

Chapter Page

Index (i) Student Initiated Talk Following a Teacher Question 61

Index (j) Transition from a Student Response to Student Initiated Talk 62

Index (k) Extended Student Initiated Talk 63

Index (l) Indirect Teacher Response to Student Talk 64

Index (m) Direct Teacher Response to Student Talk 65

FIAC RATIOS 67

Question 1: I/D Ratio 67

Question 2: i/d Ratio 68

Question 3: Teacher Talk-Student Talk Ratio 69

Question 4: Indirect Teacher Response to Direct Teacher Response Ratio 70

FIAC Ratio Results 70

SUMMARY 72

5. SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS 73

SUMMARY 73

Null Hypotheses Rejected 75

Student teachers 75

First year teachers 75

Second year teachers 76

Chapter Page

Third year teachers 76

Null Hypotheses Accepted 76

Student teachers 76

First year teachers 77

Second year teachers 77

Third year teachers 77

CONCLUSIONS 79

IMPLICATIONS 80

RECOMMENDATIONS 81

REFERENCES 83

APPENDICES

A. PRE-SERVICE FIAC INSTRUCTION 88

B. PARTICIPANT PROCEDURAL CHECKLIST 91

C. MATRICES FOR GROUPS AND SUBGROUPS 93

LIST OF TABLES

Table		Page
1.	Index (a) Student Talk - $H0_a$, $H1_a$, $H2_a$, and $H3_a$	53
2.	Index (b) Teacher Talk - $H0_b$, $H1_b$, $H2_b$, and $H3_b$	54
3.	Index (c) Content Cross - $H0_c$, $H1_c$, $H2_c$, and $H3_c$	55
4.	Index (d) Modified Indirect Influence - $H0_d$, $H1_d$, $H2_d$, and $H3_d$	56
5.	Index (e) Modified Direct Influence - $H0_e$, $H1_e$, $H2_e$, and $H3_e$	57
6.	Index (f) Extended Use of Student Ideas - $H0_f$, $H1_f$, $H2_f$, and $H3_f$	58
7.	Index (g) Extended Criticism - $H0_g$, $H1_g$, $H2_g$, and $H3_g$	59
8.	Index (h) Student Response to a Teacher Question - $H0_h$, $H1_h$, $H2_h$, and $H3_h$	60
9.	Index (i) Student Initiated Talk Following a Teacher Question - $H0_i$, $H1_i$, $H2_i$, and $H3_i$	61
10.	Index (j) Transition from a Student Response to Student Initiated Talk - $H0_j$, $H1_j$, $H2_j$, and $H3_j$	62
11.	Index (k) Extended Student Initiated Talk - $H0_k$, $H1_k$, $H2_k$, and $H3_k$	63
12.	Index (l) Indirect Teacher Response to Student Talk - $H0_l$, $H1_l$, $H2_l$, and $H3_l$	64
13.	Index (m) Direct Teacher Response to Student Talk - $H0_m$, $H1_m$, $H2_m$, and $H3_m$	65

Table		Page
14.	Subgroups Demonstrating Significance at .05 or Above with a Frequency Higher than Expected by Chance	66
15.	I/D Ratio Values by Subgroups and Years of Teaching Experience	68
16.	i/d Ratio Values by Subgroups and Years of Teaching Experience	69
17.	Teacher Talk-Student Talk Ratio by Subgroups and Years of Teaching Experience	70
18.	Indirect Teacher Response to Direct Teacher Response Ratio by Subgroups and Years of Teaching Experience	71
19.	Subgroups Exhibiting Higher Ratio Values than Corresponding Subgroups by Years of Teaching Experience	71
20.	Grand Matrix for Group A (Peru State College) with Pre-Service Instruction in FIAC	94
21.	Grand Matrix for Group C (Comparison Group) without Pre-Service Instruction in FIAC	95
22.	Student Teachers - Subgroup A0	96
23.	Student Teachers - Subgroup C0	97
24.	First Year Teachers - Subgroup A1	98
25.	First Year Teachers - Subgroup C1	99
26.	Second Year Teachers - Subgroup A2	100
27.	Second Year Teachers - Subgroup C2	101
28.	Third Year Teachers - Subgroup A3	102
29.	Third Year Teachers - Subgroup C3	103

Chapter 1

GENERAL NATURE AND PURPOSE OF THE STUDY

INTRODUCTION

Teacher education exists in a milieu of change. This fact prompted Dr. Edward C. Pomeroy, Executive Secretary of the American Association of Colleges in Teacher Education, to depict teacher education as a "profession of change." After noting the constant controversy surrounding the crucial role of the preparation of teachers, he pondered:

> Is it so surprising, then, that we are at odds about how best to prepare him? The role of the teacher changes as new insights into learning are gained, as new research and innovative programs become operational, and as differing needs of society become apparent, but the value of teachers qualified to perform their roles with students remains constant. . . . It [teacher education] is a field of activity that deals with change, modifies itself by change, and flourishes through change (Pomeroy, 1972:5).

Despite innumerable attempts to improve the performance of teachers, a scarcity of research evidence exists to provide teacher educators with reliable guidelines for developing pre-service curriculum. After reviewing studies of teacher effectiveness, Barr et al (1953:657) observed:

> The simple fact of the matter is that, after 40 years of research on teacher effectiveness during which a vast number of studies have been carried out, one can point to few outcomes that a superintendent of schools can safely employ in hiring a teacher or granting him tenure, that an agency can employ in certifying teachers or that a teacher-education faculty can employ in planning or improving teacher-education programs.

After analyzing the views of Ryans and Barr, Parrish (1968:2) succinctly identified five factors which the authors believed were instrumental in the failure of teaching effectiveness research:

1. The complexity of the task.
2. The shifting criteria of teaching effectiveness.
3. The lack of dependable research instruments.
4. The lack of competent researchers.
5. The lack of sufficient funds to carry out adequate research.

Dunkin and Biddle (1974:13) identified other problems cited by critics of teacher effectiveness research:

1. failure to observe teaching activities;
2. theoretical impoverishment;
3. use of inadequate criteria of effectiveness; and
4. lack of concern for contextual effects.

Due to the multitude of research problems associated with establishing teacher effectiveness, Dunkin and Biddle regard research on "teaching" as a more promising approach. B. O. Smith is credited with providing the rationale for research on teaching as a field of investigation. By treating teaching (classroom processes) and learning (pupil growth) as separate concepts, Smith established teaching "as a phenomenon worth studying in its own right" (Dunkin and Biddle, 1974:16).

This concern with the actual processes occurring in the classroom has encouraged a development of numerous observation systems designed to focus on various aspects of classroom interaction. Simon and Boyer (1970) edited an anthology of 79 observation systems including instruments designed by Anderson, Bales, Flanders, Hough, Medley, and Hughes. The reason for the proliferation

of classroom observation systems "appears to be due to their fulfilling a function vital to both educational research and to teacher training. They provide the objective data necessary for research, teacher training and supervision" (Simon and Boyer, 1970:A16).

As a method for analyzing the verbal behavior of the teacher and students in the classroom, Flanders' Interaction Analysis Categories (FIAC) has gained prominence as an innovation in education (Unruh and Alexander, 1970; Von Haden and King, 1971; Woodruff, 1968). In reviewing many of the promising innovations in education, Wilhelms (1973:13) identified FIAC as his first choice as a method to improve teaching. In describing FIAC as "functionally equivalent to a new religion" in education, McClellan (1971:7) cited Ned Flanders as the "chief prophet" of interaction analysis providing the "new convert with skills and techniques of good classroom manners."

McClellan's observation was quite accurate in reflecting an increasing awareness and interest by educators in the use of FIAC in the preparation of teachers. The FIAC system is frequently cited in the literature as being one of the most widely used observation systems. In a survey of 847 teacher education institutions conducted in 1968, Johnson (1968:57) reported about half of the institutions had utilized Flanders to some extent. Some institutions (26 percent) indicated "a small amount" of usage; a few institutions (8 percent) indicated a "good deal" of usage, and a small percentage (2 percent) indicated "extensively" utilizing FIAC.

STATEMENT OF THE PROBLEM

Due to the limited knowledge available on how to help others change their teaching behavior, Flanders (1970:348) urged research be conducted by all traditional and innovative teacher education programs to determine whether change is actually produced in teaching performance as a result of the curricula. A review of the literature reveals only two studies which follow-up prospective teachers having instruction in FIAC beyond the student teaching experience (Gellman, 1968; Sandefur et al, 1969). The paucity of research investigating the effects of FIAC beyond the initial teaching behaviors in student teaching prompted this research.

PURPOSE

The purpose of the study was to determine whether differences in verbal interaction existed between a group with pre-service instruction in FIAC and a comparison group without such instruction based on certain FIAC indices and ratios. This latitudinal research study examined the relationship between pre-service instruction in FIAC and the verbal interaction of student teachers and first, second, and third year teachers.

NULL HYPOTHESES RELATING TO VARIOUS INDICES

H0 There are no significant differences in verbal interaction between student teachers in Subgroup A0 and student

teachers in Subgroup C0 who have received pre-service instruction in FIAC and student teachers in Subgroup C0 who have not received instruction in FIAC based on the following indices: (a) Student talk, (b) teacher talk, (c) content cross, (d) modified indirect influence, (e) modified direct influence, (f) extended use of student ideas, (g) extended criticism, (h) student response to a teacher question, (i) student initiated talk following a teacher question, (j) transition from a student response to student initiated talk, (k) extended student initiated talk, (l) indirect teacher response to student talk, and (m) direct teacher response to student talk.

H1 There are no significant differences in verbal interaction between first year teachers in Subgroup A1 who have received pre-service instruction in FIAC and first year teachers in Subgroup C1 who have not received instruction in FIAC based on the aforementioned indices.

H2 There are no significant differences in verbal interaction between second year teachers in Subgroup A2 who have received pre-service instruction in FIAC and second year

teachers in Subgroup C2 who have not received instruction in FIAC based on the aforementioned indices.

H3 There are no significant differences in verbal interaction between the third year teachers in Subgroup A3 who have received pre-service instruction in FIAC and third year teachers in Subgroup C3 who have not received pre-service instruction in FIAC based on the aforementioned indices.

FIAC RATIOS

The following questions were investigated:

Q_1 What difference, if any, will exist in the value of the I/D ratio within the subgroups paired on the basis of number of years of teaching experience?

Q_2 What difference, if any, will exist in the value of the i/d ratio within subgroups paired on the basis of number of years of teaching experience?

Q_3 What difference, if any, will exist in the value of the teacher talk-student talk ratio within subgroups paired on the basis of number of years of teaching experience?

Q_4 What difference, if any, will exist in the value of the indirect teacher response to direct teacher response ratio within subgroups paired on the basis of number of years of teaching experience?

SIGNIFICANCE OF THE STUDY

Too often the process of curriculum development in pre-service teacher education becomes a product of accretion rather than discretion. The tendency exists for teacher education programs to place major emphasis on the adoption of innovations to reflect the most recent trends in teacher education. The task of evaluation of the innovation is often neglected in the process.

Caution must be exercised in teacher education to avoid creating curriculum which merely reflects infatuation with an educational fad rather than a commitment to a fundamental improvement in pre-service education. Openshaw (1968:194) lamented the absence of empirical data to substantiate the validity of making changes in the curriculum. Rather than proceeding on only opinions and assumptions, educators should make an effort to make curriculum decisions based on research evidence.

The importance of conducting follow-up studies beyond the student phase of teacher preparation has received considerable attention in recent years. Sandefur (1970:2) observed: "It is evident that teacher education institutions have largely ignored the evaluation of its graduates." To eliminate this deficiency, educators have recommended conducting follow-up research of teacher education graduates (Gage and Winne, 1975:170; Merril, 1967:20; Peck 1971:91; Turner, 1975:109).

Researchers have also specifically recognized the need for more follow-up studies of teachers who have received instruction in FIAC in pre-service education (Furst and Hill, 1971:179). Bailey (1972:6) noted: "Information concerning the nature and longevity of interaction behavior patterns between pre-service training and independent classroom teaching is virtually nonexistent." This investigation was initiated to eliminate this void in educational research. In addition, the study was also intended to explore the use of FIAC on a proposed instrument to utilize in follow-up studies of pre-service education graduates.

The Recommended Standards for Teacher Education prepared by the Evaluative Study Committee of the American Association of Colleges in Teacher Education (AACTE) implemented in the fall of 1971-72, placed increased importance on evaluating teacher education graduates. This new emphasis was evident in the statement: "The ultimate criterion for judging a teacher education program is whether it produces competent graduates who enter the profession and perform effectively" (AACTE, 1971:12). The statement also noted:

> It is recognized that the means now available for making such evaluations are not fully adequate. Nevertheless, the standard assumes that an institution evaluates the teachers it prepares with the best means available and that it attempts to develop improved means for making such evaluations.

Apparently, FIAC also has potential application as one of the research instruments to conduct follow-up studies associated with the new AACTE standards. To seek ways of implementing the new standards, the AACTE requested several educators to develop models for evaluating teacher education graduates. One such model developed by Sandefur (1970:16) recommended the use of a modified

version of the FIAC system as one of the evaluation instruments to utilize in follow-up studies of graduates.

After examining the proposed AACTE standards, Woodruff (1968) authored an article in the 1968 AACTE yearbook. He reflected on the meaning of the phrase "accreditation by evaluation of the product: what it means for teacher education programs." According to Woodruff, the product of teacher education relates to the competence of the graduating teacher and subsequent performance in the field as a teacher. Woodruff (1968:240-241) stated: "It is perfectly clear that competence in teaching is NOT competence in doing what most teachers have traditionally done for generations: talking, dominating, and directing personally all activity in the classroom. . . ."

Among the innovative ideas for achieving a shift away from teacher dominance in the classroom, Woodruff recommended the use of verbal interaction analysis [FIAC] to accomplish this goal. If this concern for changing the nature of classroom interaction is representative of the impact of the new AACTE standards, the significance of this study is enhanced considerably.

This study combines an investigation into the pre-service instruction in FIAC and subsequent verbal interaction in the classroom with the use of FIAC as an instrument to follow-up graduates in conformity with new AACTE standards.

ASSUMPTIONS OF THE STUDY

This field study was based on the following assumptions:

1. The participants followed the procedures outlined in the checklist for collecting audiotape data.

2. The audiotaped segments were representative of normal verbal interaction in the classroom when an opportunity for verbal interaction existed between the students and teachers.

3. The interaction of students and teachers in the selected classrooms was representative of normal classroom behavior despite the presence of a tape recorder.

4. Three 20-minute segments of coding in FIAC accurately represents the stable teaching patterns of participants.

5. The latitudinal survey approach represents a close approximation to the results which would have been obtained by utilizing a longitudinal research design accounting for the entire time period.

LIMITATIONS OF THE STUDY

The following limitations of the study are acknowledged:

1. The results must be interpreted with caution due to the weaknesses inherent in an ex post facto research design.

2. Control of the contextual variables in the schools was not possible.

3. Participation in the study was confined to persons from the accessible population meeting the eligibility criteria established for the field study.

DEFINITION OF TERMS

FIAC

FIAC is an acronym which refers to the Flanders' Interaction Analysis Categories developed by Dr. Ned Flanders. This system consists of ten categories to classify verbal interaction in the classroom. A detailed explanation of FIAC is located in Chapter 3.

Indirect Influence

Indirect influence refers to the influence of the teacher in expanding the freedom of the student in the classroom.

Direct Influence

Direct influence refers to the influence of the teacher in restricting the freedom of the student in the classroom.

Pre-Service Instruction in FIAC

Pre-service instruction in FIAC involved 13 clock hours of practice in recording interaction behaviors, constructing and interpreting interaction matrices, and developing indirect teaching skills. This pre-service instruction was provided in the teacher education program at Peru State College, Peru, Nebraska. This institution is accredited by the North Central Association of Colleges and Secondary Schools and the National Council for Accreditation of Teacher Education as a bachelor's degree granting college.

Latitudinal Study

A latitudinal study is a follow-up procedure which enables an investigator to immediately sample a population already exhibiting the desired time dimension based on years of teaching experience. This method, also known as cross-sectional, eliminates the requirement of longitudinal studies to wait the entire specified unit of time prior to initiating research (Wise, Nordberg, and Reitz, 1967:90).

Comparison Group

This group consists of student teachers and first, second, and third year teachers who have not received pre-service instruction in FIAC from their own teacher education institution.

ORGANIZATION OF THE STUDY

The organization of the remaining portions of the study is structured as follows: Chapter 2 contains a review of the literature significantly related to the purpose of the present study; Chapter 3 includes a description of the procedures for selecting the sample, the pre-service instruction in FIAC, and the statistical treatment of the data; Chapter 4 presents the results of calculating FIAC ratios and chi-square tests of significance on selected FIAC indices; and Chapter 5 contains the summary, conclusions, implications, and recommendations.

Chapter 2

REVIEW OF THE LITERATURE

INTRODUCTION

The purpose of this review of the literature was to establish a frame of reference for this study in classroom verbal interaction. This chapter was subdivided into the following sections: (1) Early Efforts in Interaction Analysis, (2) The Development of FIAC, (3) Applications of FIAC, (4) FIAC Pre-Service Instruction, (5) Pre-Service FIAC Follow-Up Studies, and (6) Summary.

EARLY EFFORTS IN INTERACTION ANALYSIS

Early attempts at analyzing teaching behavior provided useful approaches to investigating the dynamics of verbal and non-verbal classroom interaction. Many of the precursors of the present systems of interaction analysis represented efforts to record actual classroom or group behavior in a meaningful and objective manner. The approaches focused on providing an accurate count of the occurrence of certain behaviors in group dynamics. The pioneers in classroom interaction research identified certain fundamental behaviors existing in the complex process of instruction.

Contemporary researchers have now isolated 600 promising behaviors or "micro-elements" for classroom research purposes (Campbell and Barnes, 1969:587).

One such micro-element, the use of questioning in the classroom, was investigated by Stevens in 1912. Rather than relying on the usual "casual impressions" in observing teachers, Stevens applied direct observation to count the actual number of questions asked by teachers in 100 random observations of classrooms of secondary teachers.

Stevens noted the pedagogical overemphasis in the use of questions by teachers in the classrooms. A "high pressure atmosphere" with a "pace that kills," observed Stevens, existed in classrooms of teachers accustomed to a drill pattern involving 200 questions and answers during a 45-minute period of instruction. Stevens (1912:17-22) also noted that teacher verbal activity accounted for 64 percent of class activity, while pupil participation only accounted for 36 percent in the classes observed.

Besides isolating certain micro-elements for research purposes, early investigators developed symbols for abstracting classroom interaction. In 1914, Horn developed a system to record the quantity and quality of verbal and non-verbal participation by students during classroom recitation. Notations on the classroom seating charts were made by using circles and squares to indicate the type of activity; a circle represented a verbal recitation and a square depicted "doing something." A qualitative dimension utilizing the letter "F" could be inserted inside a circle or square to indicate an inappropriate response by a student (Horn, 1914:4).

Puckett (1928) elaborated on Horn's system of recording classroom interaction by indicating various kinds of classroom participation. Fourteen symbols

were marked on the classroom seating chart. The following six symbols were utilized to indicate a pupil response:

- ● Pupil raised hand.
- ⊙ Pupil raised hand and was called on by teacher.
- □ Pupil called on when he did not have hand raised.
- ▣ Pupil called on when he did not have hand raised; made no response.
- > Pupil asked a question.
- I Pupil spoke without being addressed by teacher.

A qualitative dimension could be designated by rotating a direction indicator around a circle or square in four directions. One of the eight additional symbols is shown below.

Ⓠ Pupil raised hand, was called on by teacher, and made a single-word response (Puckett, 1928:209).

Dorothy S. Thomas and her associates (Thomas et al, 1929) are credited with pioneering a new area of investigation referred to as "classroom climate" (Medley and Mitzel, 1963:263). Emphasis was placed on objectively and accurately recording the activities of nursery school children. The investigations included: Categorizing the verbal and non-verbal activities of the children into discrete behavioral units; quantifying the number of times a type of activity occurred; and developing indices to assess behaviors, such as laughter, in the classroom. A stop watch and stenographic records were utilized during direct observation of the children to insure accuracy of observations (Thomas et al, 1929:1-29).

H. H. Anderson (1939:73-89) investigated the adult-child relationships of pre-school children. A Domination-Integration ratio was developed to

indicate the nature of an adult influence as either dominative (dictatorial) or integrative (democratic) behavior. Dominative behavior consisted of the use of force, threats, and commands. Socially integrative behavior, in contrast, aimed at seeking voluntary cooperation of pre-school children.

An observation form was developed to record the occurrence of the dominant and integrative behaviors in the form of categories. The Domination-Integration ratio was obtained by dividing an average number of domination contacts per hour by the average number of integration contacts per hour. Behaviors indicating degrees of domination and integration were recorded in categories depending on the presence or absence of conflict in the relationships in the classroom.

Lippitt and White (1943) conducted several studies involving "social climate" of children's groups. The first experiment explored methods of creating and describing two different kinds of climates in children's social clubs by varying the extent and nature of control exerted by the adult leaders. Two styles of leadership were labeled as "democratic" and "authoritarian." The second experiment expanded the scope of the study by including laissez-faire as another type of leadership. The study also explored the effects upon the individual and the group of the three types of social atmospheres.

The three types of leadership included: A monopoly of planning and decision-making by the leader (authoritarian); shared decision-making (democratic); and freedom of students to make decisions with minimal supervision (laissez-faire) from an adult (Lippitt and White, 1943:487).

In 1949, Withall developed seven categories to encompass the types of statements which teachers make in the classroom (Withall, 1967:50). Three of the categories were representative of "learner centered" behaviors by teachers, such as praise, accepting feelings and ideas, and asking questions to facilitate problem solving. A neutral category included behaviors, such as polite formalities and administrative procedures. The last three categories included giving students directions, reproving remarks, and statements by the teacher in order to justify a course of action. Based on his use of the seven category system, Withall concluded social-emotional climate should be coded in an objective, reliable, and valid manner (Withall, 1967:62-63).

Bales (1950) developed a 12 category system called "interaction process analysis" to study the behavior of small groups. The behaviors were recorded in sequence by utilizing a special mechanism, an interaction recording device, to move tape at a constant rate of speed while numbers were recorded on the tape at a rate of 10 to 15 scores a minute.

A matrix system was also utilized to identify the nature of interaction between members in the small groups. Interaction process analysis provided categories to indicate instances of communication of positive feelings, task related actions, and the expression of negative feelings by individuals in small groups (Bales, 1950:9).

THE DEVELOPMENT OF FIAC

The early efforts in interaction analysis were influential in the evolution of FIAC as an interaction analysis system. The basic system was developed by Flanders and his colleagues during 1955 and 1960 at the University of Minnesota (Flanders, 1970:33). According to Flanders (1965:51), the earliest category system for interaction analysis had only one category for student talk; the earliest categories of teacher talk are listed below.

Category 1: accepts and clarifies feeling
Category 2: praises and encourages
Category 3: asks questions of procedure
Category 4: accepts, and/or clarifies student ideas
Category 5: asks general questions
Category 6: routine administration or unrelated to learning
Category 7: gives information, opinion
Category 8: gives directions
Category 9: gives criticism
Category 10: justifies own authority

The coding procedures involved placing a tally above a horizontal line when the teacher talk was initiated by the teacher; a tally was recorded below the line when the communication was in response to a student initiated communication. The tallies were counted by categories; the provision for recording the sequence of teacher and student behaviors was not yet developed (Flanders, 1965:51-52). The present system of FIAC displayed in Figure 2 on page 34 was a refinement of the original categories developed for interaction analysis.

APPLICATIONS OF FIAC

While the category system was in the stages of refinement, studies were initiated in Minnesota in 1955 and later in New Zealand in 1957. The instrument was utilized to investigate a question concerning the relationships between the patterns of teacher influence and pupil attitudes toward their school work and teachers. Flanders (1965:64) concluded:

> The same answer to this question was found in Minnesota and New Zealand, some 8,000 miles apart, in spite of differences in teaching style and pupil expectations. The teachers of classes that scored high on liking the teacher, motivation, fair rewards and punishments, lack of anxiety, and independence used more indirect influence, while the teachers of classes that scored low used less indirect influence.

The above study prompted research concerning the effect of indirect and direct teacher influence in the classroom. Investigations were initiated attempting to describe the nature and extent of the relationship between one particular teaching style and subsequent student attitudes and achievements. For a comprehensive review of this line of research, the reader is referred to a recent review of the literature, The Study of Teaching (Dunkin and Biddle, 1974).

In addition to the contribution of FIAC as a research instrument, the use of FIAC has the potential of enhancing the quality of communication to enable educators and prospective teachers to concisely and precisely describe the verbal classroom interaction. As one of the most widely used "observation systems," FIAC serves the function of providing a technical language. "Observation systems are simply sets of categories which describe verbal and non-verbal behavior.

The categories which make up the systems are related to communication, as parts of speech are to grammar" (Simon and Boyer, n.d.:1).

As a technical language for educators, FIAC meets the following criterion as described by Simon and Boyer (n.d.:3):

> To be useful for describing teaching, a technical language needs to meet three requirements. First, it must be descriptive as opposed to evaluative and, although it can be used to analyze emotional or evaluative situations, the language itself must be descriptive of the values or feelings being discussed. Second, a technical language must deal with what can be categorized or measured. And, third, a technical language must deal with small bits of action or behavior rather than with global concepts.

Several concepts are crucial to understanding the use of FIAC in research in education. Both concepts refer to the amount of freedom available to the student in the classroom. "Indirect influence" refers to the teacher's acceptance of student feelings, praising, and accepting or building on the ideas of the students in the classroom. Another form of teacher talk refers to the concept of "direct influence" in the classroom consisting of lecturing, giving directions, and criticizing or justifying authority. Indirect influence promotes freedom in the classroom; direct influence inhibits freedom of the student in the classroom.

The format of FIAC consisted of ten categories; seven categories to code verbal interaction of teacher talk; two categories to code student talk; and one category to record silence or confusion in the classroom (Flanders, 1970:34). Based on the experience of Flanders, educators can expect "an average of 68 percent teacher talk, about 20 percent pupil talk, and 11 or 12 percent silence and confusion" (Flanders, 1970:101). More detailed information on FIAC is located in Chapter 3.

FIAC PRE-SERVICE INSTRUCTION

The following statements by Flanders (1963:138-139) expressed the rationale for the use of FIAC in pre-service education:

> Most education students need training in the control of their own behavior, they need to learn methods of collecting data about their own behavior, they need to learn how to use tools for collecting reliable information about the reactions of students to their behavior, and they need to practice all of these skills before they begin their practice teaching.

Flanders (1970:8) believed teacher education would eventually "focus more sharply on the care and nurture of teaching behavior. When this happens, systems of interaction analysis could become the foundation of a program to prepare teachers." Flanders also envisioned the goal of such programs to be:

> to help students explore, investigate, and in some cases discover for themselves relationships between teaching behavior and classroom interaction. Because of the learning experiences, this kind of pedagogical knowledge would automatically be incorporated in the students' repertoire of behavior patterns, and this is the only kind of knowledge that has utility during a moment of teaching.

A series of studies was initiated to determine the effect of pre-service instruction in interaction analysis. Amidon and Flanders (1971:90) summarized the results of 12 studies conducted between 1963 and 1967. Student teachers trained in interaction analysis tend to:

1) Take more time to accept and use student ideas
2) Encourage a greater amount of pupil-initiated talk
3) Use less criticism
4) Use less direction
5) Be more accepting and encouraging in response to student ideas
6) Have a more generally indirect teaching style

Other educators have offered rationale for the use of FIAC in pre-service education. During the 1962-63 academic year, FIAC was included as a component in a pre-service course. Furst highly recommended other colleges of education investigate the merits of incorporating an observation system for student teachers to utilize self-analysis. Furst (1967:328) observed: "The possibilities seem almost limitless for effective pre-service training which closed the gap between conceptualization of teaching and operational performance in the classroom."

Amidon (1967:54) noted the outcome of supervising teachers and student teachers learning interaction analysis; the students seemed to expand their repertoire of behavior. Finske (1967:71) observed the potential of interaction analysis could promote inquiry to provide a means of self-improvement in teaching. Finske also suggested the need for follow-up studies to investigate the effects of interaction analysis training.

The rationale for follow-up studies of innovations, such as FIAC, was discussed in Chapter 1. A number of follow-up studies have been conducted on student teachers regarding the effects of pre-service training. Lohman (1966:12) observed: "Student teachers trained in interaction analysis use more verbal behaviors that have been found to be associated with higher student achievement and positive pupil attitude." The study involved 30 student teachers trained in interaction analysis and a comparison group of 30 student teachers without such training. A 13 category modification of FIAC was the observational tool in following-up the student teachers 4 to 12 months after the training program. More indirect behavior, more student initiated talk, and less

direct teacher talk were observed in classes of students trained in interaction analysis (Lohman, Ober, and Hough, 1967:359).

In a follow-up study of secondary science student teachers at Cornell University from 1963 to 1966, McLeod (1967:111) noted student teachers trained in interaction analysis had a greater magnitude of indirect teaching influence. Follow-up studies have been recommended beyond student teaching to determine whether these differences would diminish (McLeod, 1967:113; Kirk, 1964:195). If the effect of training is short range, McLeod (1967:113) believed the training should be discontinued, but continue the use of interaction analysis as a research tool.

Regarding the effects of FIAC or modified FIAC on verbal interaction of teachers trained in the system, Lewis (1974:75-77) reported no significant differences in verbal behavior after an experimental research program conducted on 25 male health and physical education students after seven 90-minute training sessions in FIAC. A review of research by Dunkin and Biddle (1974:114) revealed most experimental treatments produced teacher indirectness. Unfortunately, the scope of the review for this study permits only a limited exploration of the literature on the effects of pre-service instruction in FIAC on student teachers.

PRE-SERVICE FIAC FOLLOW-UP STUDIES

Greenberg (1970:148) recommended interaction longitudinal studies be initiated to investigate "specific teachers, children and classes over time" as a

potential means of identifying "school life patterns." Bosch (1972:170-172) obtained data of interest about school interaction patterns by analyzing the patterns of 39 teachers. He identified the 4-8-5 (question-limited student response-and lecture cycle) constituted almost 25 percent of the interaction; the 4-8-3 (question-limited student response-and building on student ideas) comprised over 20 percent of the classroom patterns. This kind of research provides another foundation for follow-up studies as suggested in Chapter 1.

In an investigation of the cooperating teachers' effect of student teachers' verbal behaviors, Halley (1974:32) utilized audiotapes to collect data. The use of audiotapes was a means of observation rather than physical presence of an observer. Halley noted the advantages of this approach included: Lack of difficulty in scheduling visits for data collection; the unobtrusive character of a tape recorder; less anxiety by teacher about being taped; and the fuel savings involved during an energy crisis.

Some methodological considerations of conducting follow-up studies utilizing FIAC provide potential problems. Halley (1974:29) attempted to secure the participation of 30 cooperating teachers and 30 student teachers in the observational study. Of 45 [pairs] contacted, only 17 pairs completed the study. Most of the attrition in the study was due to inappropriate taping conditions (individualized study prevented class discussion); other teachers were simply too busy or disinterested in the project.

A review of the literature revealed a paucity of research on the effects of pre-service instruction in FIAC beyond the initial student teaching experience.

Only two studies were identified investigating the long range effects of pre-service instruction in interaction analysis.

Gellman designed an experimental investigation of the persistent effects of the use of interaction analysis as a means of instruction and supervision of student teachers. The study investigated classroom performance and teacher attitude of beginning teachers who were trained in interaction analysis. With regard to classroom teaching patterns, Gellman (1968:100-101) reported training in interaction analysis did not affect the amount of teacher talk, student talk, and extended or student initiated talk used in the classroom of first year teachers who had interaction analysis training.

Sandefur et al (1969:41-45) examined the change in teaching behavior by utilizing a 16 category observation system, a modification of the FIAC system. A comparison was made between the verbal behavior exhibited in student teaching and first year teaching. The experimental group consisted of 25 secondary teachers who had received pre-training in the skills of indirect teaching by FIAC and other methods. The control group consisted of 25 secondary teachers without this indirect training in pre-service instruction. Three 20-minute audiotape sessions of classroom activity were coded and analyzed. With regard to interaction analysis, Sandefur et al (1969:44-45) concluded:

> A. Teachers seem to reduce the percentage of time spent lecturing as a result of experience.
> B. Experienced teachers tend to spend more time in directed practice than do inexperienced teachers.
> C. The ratio of indirect verbal activity to direct verbal activity appears to increase with experience.

D. Extended direct influence appears to diminish as a result of experience.

E. Teachers sensitized in pre-service professional programs to the use of indirect teacher influence, specifically to the acceptance of feeling, praise and encouragement, and accepting of students ideas, seem to expand the use of these categories as compared to their use of direct categories of directions, criticisms, and corrective feedback.

SUMMARY

This chapter explored the development of the early efforts in developing interaction analysis systems. A few of the applications of FIAC were discussed including serving as a "technical language" among educators to enhance clarity of communication. Indirect and direct teacher influence were defined based on the amount of freedom available to the student in the classroom.

Research utilizing follow-up study methodology was described including the use of audiotapes to collect classroom interaction data. Several studies investigating the effects of instruction beyond the initial student teaching experience were also discussed. A review of the literature revealed a paucity of research studies investigating the effects of pre-service instruction in FIAC beyond the student teaching experience.

Chapter 3

RESEARCH, METHODS, AND PROCEDURES

INTRODUCTION

For convenience of communication, several symbols refer to the various groups and subgroups in this study. Group A consists of student teachers and first, second, and third year teachers who had received pre-service instruction in FIAC at Peru State College, Peru, Nebraska. The subgroups in Group A are identified by the letter A followed by a number representing the years of teaching experience. The four subgroups in Group A are: Student teachers (A0), first year teachers (A1), second year teachers (A2), and third year teachers (A3).

Group C refers to all participants in the study serving as members in a comparison group without pre-service instruction in FIAC. The subgroups in Group C are identified by the letter C followed by a number to represent the years of teaching experience. The four subgroups in Group C are: Student teachers (C0), first year teachers (C1), second year teachers (C2), and third year teachers (C3).

SELECTION OF GROUPS

In selecting participants in the study, student teachers and teachers in Group A were selected first; then a corresponding number of eligible student

teachers and teachers in Group C were also identified. Both groups were selected from a stratified random sample of eligible participants. The optimum level of participation expected was 16 participants in each subgroup; 64 participants in each group; and a total of 128 participants in the study. Figure 1 displays the various subgroups.

Group	Student Teachers	1st Year Teachers	2nd Year Teachers	3rd Year Teachers	Total
A	A0	A1	A2	A3	
	16	16	16	16	64
C	C0	C1	C2	C3	
	16	16	16	16	64

Figure 1

Subgroups in Latitudinal Design

Standard Selection Procedure

Although the selection procedure varied slightly for the student teachers and graduates in Groups A and C, certain standard procedures were adopted across all groups participating. Once an accessible sample was identified in each subgroup, a table of random numbers was utilized to determine the order in contacting the potential participants.

To provide orientation to the study, each potential participant received a letter describing the nature and purpose of the study. The potential participant was assured all data identifying individuals would be kept confidential; however, each participant was eligible to receive a copy of the research results. The letter

also notified the person a telephone call would be placed by the investigator to the potential participant clarifying the purpose, eligibility requirements, and taping procedures.

All participants in the study needed to have the appropriate number of years of teaching experience to qualify for a particular subgroup. In addition, the opportunity for classroom interaction must be present in the participant's classroom. If a teacher only utilized independent study as a method, for example, the teacher would not be eligible to participate in the study. If the person was eligible and willing to participate, a letter was written to the teacher's principal and superintendent to secure cooperation. A self-addressed, stamped postcard was requested to be returned to the researcher at Peru, with permission for the student teacher or teacher to participate.

Standard Orientation Procedure

Upon receiving permission of the principal and superintendent for a student teacher or teacher to participate, a packet of materials was mailed to each participant including an orientation checklist and three cassette audiotapes. (For checklist, see Appendix B, page 91.)

The checklist provided information regarding specific procedures to observe subsumed under four categories: (1) Preparation for taping, (2) taping instructions, (3) a description of inappropriate taping situations, and (4) arrangements for returning the audiotapes. Instructions to the participants included: Make every effort to obtain a quality audiotape recording; tape record five 20-minute sessions of normal classroom instruction when an opportunity for

teacher-student verbal interaction was present. If an audiotape was not representative of classroom verbal interaction because of an unusual occurrence, the teacher was requested to retape a class session.

Selection of Subgroups A1, A2, and A3

During the summer of 1971, potential participants in Subgroups A1, A2, and A3 were mailed an explanation of the purpose and procedures of the study. Teacher education graduates of 1969, 1970, and 1971, from Peru State College, were requested to complete a questionnaire to determine their eligibility to be included in the study. The completed questionnaires provided a data source to utilize as a means of selecting participants. Many of the questionnaires were returned by teacher education graduates who were not presently employed in teaching and, therefore, not eligible to participate.

The low percentage of returns of eligible participants using this procedure would have required multiple mailings to obtain the desired number of teachers eligible and willing to participate in the study. Since this method proved to be an unsatisfactory approach in locating eligible participants, the method of selection was revised to allow more direct access to the teacher education graduates.

The actual identification of eligible participants in the study occurred during the spring semester of 1972. A list of Peru State College teacher education graduates currently teaching was obtained from the Peru State College Placement Center to serve as the accessible sample to select teachers

for Subgroups A1, A2, and A3. The standard selection procedures were followed in identifying participants in Subgroups A1, A2, and A3; the standard orientation procedures were also followed when a person consented to participate in the study.

Selection of Subgroups C1, C2, and C3

After teachers in Subgroups A1, A2, and A3 were selected, the Nebraska Educational Directory (1971) was consulted to obtain names of teacher education graduates of other institutions in locations in the same school districts as members in Subgroups A1, A2, and A3. The accessible population consisted of teachers with one, two, or three years of teaching experience who qualified to be in Subgroups C1, C2, and C3 based on years of teaching experience. However, exposure to FIAC during pre-service or in-service instruction disqualified potential participants from taking part in the study. The standard selection and orientation procedures were followed for Subgroups C1, C2, and C3.

Selection of Subgroup A0

During the spring semester of 1972, student teachers at Peru State College were provided a verbal orientation to the study by the investigator at a special meeting for this purpose. A table of random numbers was utilized to establish the order of contacting the potential participants selected from a list of student teachers. When a person consented to participate, arrangements were made to obtain the cooperation of the student teacher's principal and superintendent. The standard orientation procedure was followed for each student teacher in Subgroup A0.

Selection of Subgroup C0

After the 16 student teacher participants from Peru State College were identified, the chairpersons of other pre-service teacher education institutions in the area were requested to provide lists of student teachers. This request was made only to pre-service education institutions which did not offer FIAC in pre-service instruction. The standard selection and orientation procedures were also followed for Subgroup C0.

PRE-SERVICE INSTRUCTION IN FIAC

The participants in Group A received 13 clock hours of instruction and practice in FIAC during pre-service instruction at Peru State College. The unit of instruction in FIAC was incorporated into required teacher education courses for both elementary and secondary prospective teachers. Each subgroup received the pre-service instruction in the following academic years: A0 (1971-72), A1 (1970-71), A2 (1969-70), and A3 (1968-69).

Prospective teachers majoring in elementary education received FIAC instruction in a course titled Education 405 - Teaching in the Elementary School. Secondary education majors received FIAC instruction in a course titled Education 404 - Preparation for Secondary Education.

Both the prospective elementary and secondary teachers received a 13 hour unit of pre-service instruction in FIAC. Four phases were included in the FIAC unit: (1) Orientation, (2) skill development in recording interaction, matrix construction, and matrix interpretation, (3) developing expertise in FIAC by

application of the system in small groups and independent study, and (4) behavior modification during student teaching using self-analysis.

Orientation

During the orientation phase, students were exposed to fundamental information regarding FIAC. Topics discussed included: The rationale, theory, and research associated with FIAC, verbal interaction categories, ground rules for coding, and the differences between indirect and direct teachers in the amount of freedom given to the students in the classroom.

The following information provides a description of the ten categories of interaction analysis and related concepts; this information represents a sampling of the type of course content provided in pre-service instruction during the orientation phase.

In the ten categories of FIAC, each category represents mutually exclusive verbal behaviors in classroom interaction. Figure 2 contains a brief explanation of the behaviors. Each verbal behavior falls into one of three main classifications: Teacher talk, student talk, or silence and confusion.

Teacher talk can be either indirect or direct. Indirect influence relates to the verbal behavior of the teacher in expanding opportunities for the freedom of the student. The first four categories serve this purpose: (1) Accepting a student's feelings; (2) encouraging or praising the student; (3) accepting or using ideas of the student; and (4) encouraging student participation by asking questions.

FLANDERS' INTERACTION ANALYSIS CATEGORIES* (FIAC)

Teacher Talk	Response	1. ACCEPTS FEELING. Accepts and clarifies an attitude or the feeling tone of a pupil in a nonthreatening manner. Feelings may be positive or negative. Predicting and recalling feelings are included.
		2. PRAISES OR ENCOURAGES. Praises or encourages pupil action or behavior. Jokes that release tension, but not at the expense of another individual; nodding head, or saying "Um hm?" or "go on" are included.
		3. ACCEPTS OR USES IDEAS OF PUPILS. Clarifying, building, or developing ideas suggested by a pupil. Teacher extensions of pupil ideas are included but as the teacher brings more of his own ideas into play, shift to category five.
		4. ASKS QUESTIONS. Asking a question about content or procedure, based on teacher ideas, with the intent that a pupil will answer.
	Initiation	5. LECTURING. Giving facts or opinions about content or procedures; expressing his own ideas, giving his own explanation, or citing an authority other than a pupil.
		6. GIVING DIRECTIONS. Directions, commands, or orders to which a pupil is expected to comply.
		7. CRITICIZING OR JUSTIFYING AUTHORITY. Statements intended to change pupil behavior from nonacceptable to acceptable pattern; bawling someone out; stating why the teacher is doing what he is doing; extreme self-reference.
Pupil Talk	Response	8. PUPIL-TALK—RESPONSE. Talk by pupils in response to teacher. Teacher initiates the contact or solicits pupil statement or structures the situation. Freedom to express own ideas is limited.
	Initiation	9. PUPIL-TALK—INITIATION. Talk by pupils which they initiate. Expressing own ideas; initiating a new topic; freedom to develop opinions and a line of thought, like asking thoughtful questions; going beyond the existing structure.
Silence		10. SILENCE OR CONFUSION. Pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

*There is NO scale implied by these numbers. Each number is classificatory; it designates a particular kind of communication event. To write these numbers down during observation is to enumerate, not to judge a position on a scale. (This description is adapted from Ned A. Flanders, Analyzing Teacher Behavior, 1970.)

Figure 2
FIAC

Direct influence relates to the teacher talk which tends to restrict opportunities of the student to exercise freedom in the classroom.

The categories which represent direct influence by the teacher are: (5) Lecturing; (6) giving directions; and (7) criticizing or justifying authority.

Student talk involves: (8) A limited response by a student; or (9) student initiated talk by a student. The final category occurs during silence and confusion in the classroom (10).

Skill Development and Interpretation

After committing the ten categories to memory, the prospective teachers were taught how to code classroom interaction by classifying the verbal behavior of teachers and students every three seconds. The numbers representing the categories were recorded in sequence on a tally sheet.

To develop skill in recording the classroom sequence of events, the prospective teachers practiced coding tape recordings of classroom interaction. Gradually, the length of a session of coding was increased to encompass a standard 20 minutes of coding consisting of 400 tallies based on an average of 20 behaviors coded each minute.

After becoming proficient in classifying verbal behaviors and recording interaction in numerical sequence, the prospective teacher practiced making tabulations into a matrix. Figure 3 shows how the sequence of numbers is recorded. By accepted practice, a category ten is always the first and last number recorded in the sequence of numbers representing classroom interaction.

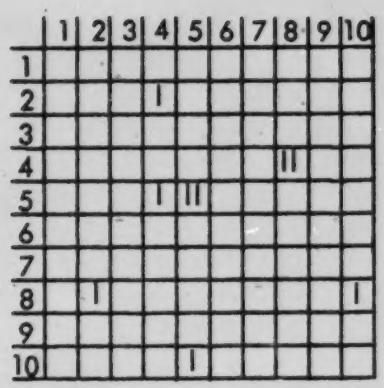
Each number in the sequence of numbers is joined into overlapping pairs of numbers, except for the first and last number. These numbers are entered into a matrix in pairs.

	Tallies	Coded Statements
1st Pair	10	Silence
	5 2nd ...	Teacher: It is important to know certain
3rd Pair	5 Pair	basic facts about how our
	5	government is organized.
	4	Teacher: How many members are in the House?
	8	Student: 435 members.
	2	Teacher: That's right. Very good!
	4	Teacher: How many members are in the Senate?
	8	Student: 100 senators.
	10	Silence

Figure 3

Sample of Coding

In Figure 4, the pairs of numbers are entered into a matrix consisting of ten columns and ten rows. The first number of a pair of numbers tabulated into the matrix designates the row location in the matrix. The second number indicates the column. The 10-5 pair, for example, is represented by placing a tally at the intersection of Row 10 and Column 5. This intersection is also referred to as the 10-5 cell in the matrix. The 5-5 pair depicts the intersection of Row 5 and Column 5. The same procedure is followed until all numbers are recorded in the matrix.



	1	2	3	4	5	6	7	8	9	10
1										
2				I						
3										
4								II		
5				I	II					
6										
7										
8		I								I
9										
10					I					

Figure 4

Sample Matrix

Achieving Closure and Expertise

After studying the fundamentals of the FIAC system, the prospective teachers were encouraged to practice recording skills utilizing audiotapes at a resource center, both in small groups and in independent study. To achieve expertise in FIAC, the prospective teachers were required to record classroom interaction with a minimum r of .55; the behavioral objectives also required expertise in analyzing and interpreting a completed matrix utilizing specified FIAC indices and ratios (See Appendix A. for FIAC pre-service behavioral objectives).

Behavior Modification

The prospective teachers were expected to utilize FIAC as a means of self-evaluation during student teaching; a behavioral objective of the FIAC instruction encouraged modification of teaching behavior based on feedback

from the self-evaluation. The long range goal of instruction in FIAC was to encourage the graduates of the pre-service education program to create learning environments in their classrooms promoting freedom for the students.

FIAC INDICES

Thirteen FIAC indices were calculated to test significant differences between verbal interaction in classrooms of Groups A and C. The matrices are displayed in Figures 5 through 10. On the left hand side of the page, the cell or cells included in the calculation of the indices are shown in a matrix. Adjacent to each matrix is a brief description of the verbal behaviors represented in each index.

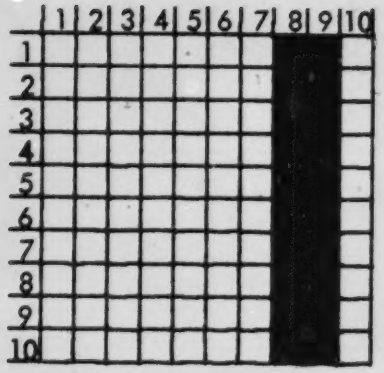


Figure 5

Index a.

a. Student Talk: Columns 8 and 9 represent the frequency of student talk response and student talk initiation.

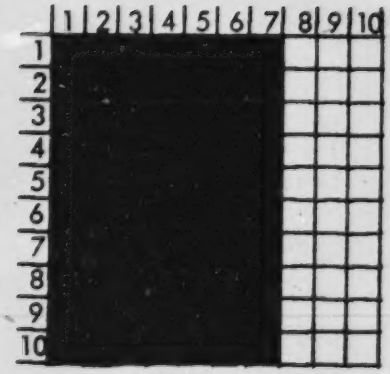


Figure 6

Index b.

b. Teacher Talk: Columns 1 through 7 represent the frequency of both indirect influence (Columns 1 through 4) and direct influence (Columns 5 through 7).

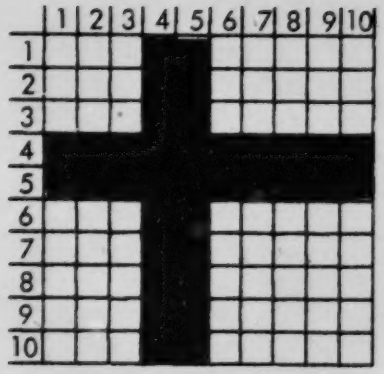


Figure 7

Index c.

c. Content Cross: Columns 4 and 5 and Rows 4 and 5 represent the frequency of questioning and lecturing by the teacher.

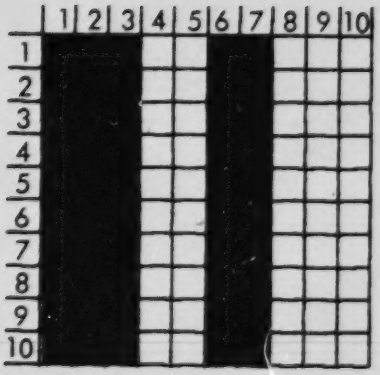


Figure 8

Indices d. and e.

d. Modified Indirect Influence: Columns 1 through 3 indicate the frequency of indirect teacher talk in accepting feelings, praising students, and building on student ideas.

e. Modified Direct Influence: Columns 6 and 7 involve the frequency of direct teacher talk in giving directions and using criticism.

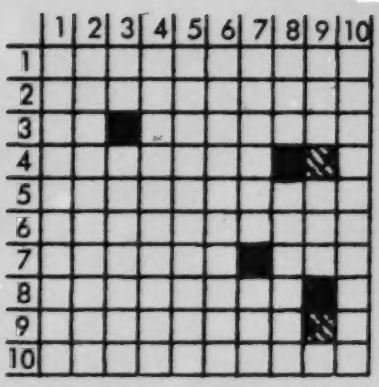


Figure 9

Indices f. through k.

f. Extended Use of Student Ideas: Intersection of Row 3, Column 3, indicates frequency of extended usage of student ideas (Cell 3-3).

g. Extended Criticism: Intersection of Row 7, Column 7, represents the extended direct teacher talk (Cell 7-7).

h. Student Response to a Teacher Question: Intersection of Row 4, Column 8, indicates the frequency of teacher questions followed by a student response (Cell 4-8).

i. Student Initiated Talk Following a Teacher Question: Intersection of Row 4, Column 9, represents the frequency of teacher questions followed by student initiated talk (Cell 4-9).

j. Transition from a Student Response to Student Initiated Talk: Intersection of Row 8, Column 9, indicates the frequency of change from student response to student initiated talk (Cell 8-9).

k. Extended Student Initiated Talk: Intersection of Row 9, Column 9, represents the frequency of extended student initiated talk (Cell 9-9).

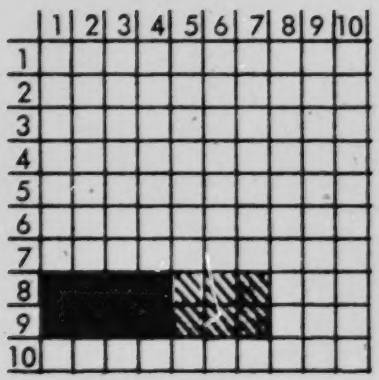


Figure 10

Indices l. and m.

l. Indirect Teacher Response to Student Talk: Intersection of Row 8, Columns 1 through 4, and Row 9, Columns 1 through 4, represents the frequency of indirect teacher talk in response to student talk.

m. Direct Teacher Response to Student Talk: Intersection of Row 8, Columns 5 through 7, and Row 9, Columns 5 through 7, represents the frequency of direct teacher talk in response to student talk.

FIAC RATIOS

The preceding description of the areas in the matrix for the FIAC indices showed the cell or cells used for counting the tallies for placement into the chi square formula as "observed" frequency counts. The following description of the FIAC ratios in Figures 11 through 14 also identified the cell or cells in the matrix to count the total tallies to compute the ratio values. Although no tests of significance were computed on the ratios, inspection of the ratio values provided useful indicators of direct or indirect influence by the participants in the subgroups.

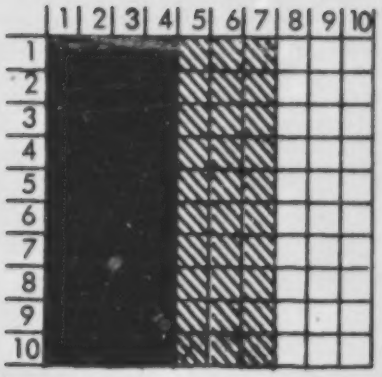


Figure 11

Q_1 Ratio

Q_1 - I/D Ratio: Calculated by dividing Columns 1 through 4 by 5 through 7. Indicates the use of indirect teacher statements as compared to direct statement. An I/D ratio of 2.0 means that for every two indirect statements by the teacher, there was only one direct statement.

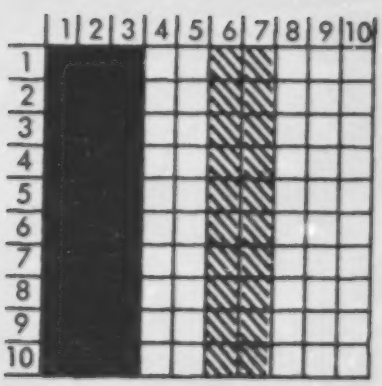


Figure 12

Q_2 Ratio

Q_2 - i/d Ratio: Calculated by dividing Columns 1 through 3 by 6 and 7. Determines the emphasis given to motivation and control in the classroom. This ratio eliminates the effect of Categories 4 and 5 (lecture and asking questions).

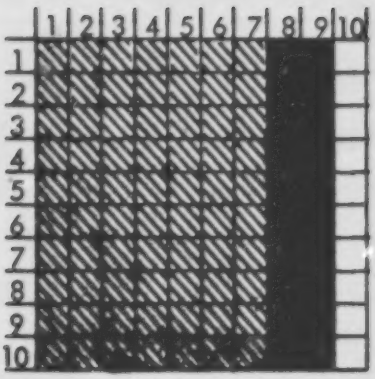


Figure 13

Q_3 Ratio

Q_3 - Teacher Talk-Student Talk Ratio: Calculated by dividing Columns 1 through 7 by 8 and 9. Determines how much opportunity students are given to enter into discussions.

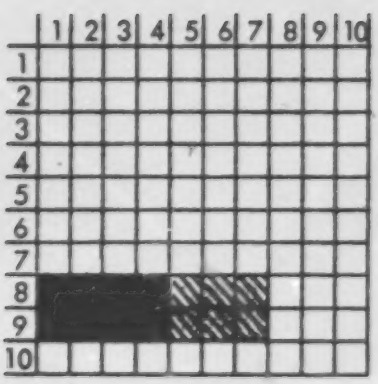


Figure 14

Q_4 Ratio

Q_4 - Indirect Teacher Response to Direct Teacher Response Ratio: Calculated by dividing Row 8, Columns 1 through 4 and Row 9, Columns 1 through 4 by Row 8, Columns 5 through 7 and Row 9, Columns 5 through 7.

DATA COLLECTION

Problems are normally associated with seeking the cooperation of teachers to participate in studies utilizing FIAC as a research instrument for classroom observation. Flanders (1970:386) warned it is not unusual for the refusal rate of teachers requested to participate to range between 10 to 50 percent.

The degree of cooperation to expect in this type of study was to a large extent unknown. To encourage maximum participation, the tasks assigned each participant were set at the absolute minimum. The data collected from each participant were limited to the collection of the primary data needed for the study: Five 20-minute audiotapes from each of the potential 128 participants.

Several problems were anticipated by the investigator in conducting the study. Participants in the field study were selected from classroom teachers in Nebraska, Iowa, Kansas, and Missouri. Such a large geographical area posed potential communication problems with all the participants and cooperating principals and superintendents.

Personal visitation with each participant was considered desirable, but impractical; communication was confined to correspondence and telephone calls. Each participant was expected to arrange to audiotape classroom teaching without the assistance of the researcher or the use of professional sound recording equipment. Inherent in this procedure was a risk of poor quality tape recording through the use of faulty equipment or ineffective audiotaping procedures.

In considering the findings listed in the next chapter, Chapter 4, it should be noted attrition did occur across all subgroups. The optimal level of participation of 16 participants per subgroup was not achieved; the actual number of participants in each subgroup is listed below.

Groups	0	1	2	3	Total
A	9	14	14	8	45
C	11	9	15	13	48

Figure 15

Actual Subgroup Participants

Of the 35 participants who did not return usable data, 11 participants indicated inappropriate taping conditions were a contributing factor; 6 participants returned audiotapes partially completed or of poor coding quality; 5 participants returned blank audiotapes without an explanation; and 13 participants did not return the tapes for reasons unknown.

CODING PROCEDURES

To avoid any possibility of coding bias by Peru State College personnel, arrangements were made for an independent organization to handle the coding. Because of the national reputation for expertise in the area of educational research, EPIC consultants in Tucson, Arizona, were requested to complete this phase of the research under the direction of Dr. Terry Cornell, with staff

assistance from Dave Lewis. Nancy Roberson and Bonnie Olton of EPIC coded three of the five audiotapes to obtain 60 minutes of verbal interaction from each participant. The Scott's coefficient "pi" was utilized to estimate inter-coder reliability (Cornell, 1973:4).

At the beginning of coding, an r of .85 was established. Four other reliability checks occurred at intervals during the taping. The following reliability levels were achieved: After 20 hours of coding (.87); after 39 hours (.87); after 62 hours (.86); and after 84 hours of coding (.92).

STATISTICAL TREATMENT

The interaction matrix for each participant was utilized to obtain the frequency counts necessary to calculate the ratios and indices for each subgroup. All hypotheses regarding FIAC indices were tested by a chi square statistical test of significance. The calculations for the chi square tests were based on the following general formula for chi square recommended by Downie and Heath (1965:160-162):

$$X^2 = \sum \frac{(O - E)^2}{E}$$

O = Observed frequency

E = Expected frequency

The chi square test was selected based on the nature of the nominal data coded as frequencies which did not measure or rank any of the verbal statements. When the frequencies indicated a level of confidence at the .05, a relationship was inferred to exist due to instruction in FIAC and not by chance.

The .05 level of confidence was the criterion for accepting or rejecting the null hypotheses. To be considered significant at the .05 level, a chi square value of 3.841 was required. A .01 level of significance was noted whenever the chi square value was 6.635 or higher. All chi square values computed were based on one degree of freedom.

SUMMARY

Chapter 3 provided a description of the procedures for selecting participants in the study. The pre-service program in FIAC at Peru State College was described in some detail, including the goal of the program to encourage graduates to utilize indirect teaching behaviors.

The procedures for coding verbal interaction, placing the tallies into a matrix, and interpreting the matrix were also explained. The areas of the matrix of the indices and ratios were placed in graphic form. The procedures were also outlined for data collection, coding activities, and statistical treatment of the data.

Chapter 4

RESULTS OF THE STUDY

INTRODUCTION

This chapter contains a description of the findings related to the hypotheses and questions stated in Chapter 1. The first section of this chapter reports the results of chi square tests of significance. Thirteen indices were tested for statistically significant differences for each of four different levels of teaching experience. A total of 52 chi square tests was calculated. A description and graphic display of all the indices and the corresponding areas in the matrix under investigation were presented in Chapter 3.

The second section reports the results of calculating the various ratios to answer the four questions stated in Chapter 1. A description and graphic display of the ratios and corresponding areas of the matrix under investigation were presented in Chapter 3.

NULL HYPOTHESES RELATING TO VARIOUS INDICES

The hypotheses of this study were listed in Chapter 1 and also noted below.

H0 There are no significant differences in verbal interaction between student teachers in Subgroup A0 and student

teachers in Subgroup C0 who have received pre-service instruction in FIAC and student teachers in Subgroup C0 who have not received instruction in FIAC based on the following indices: (a) Student talk, (b) teacher talk, (c) content cross, (d) modified indirect influence, (e) modified direct influence, (f) extended use of student ideas, (g) extended criticism, (h) student response to a teacher question, (i) student initiated talk following a teacher question, (j) transition from a student response to student initiated talk, (k) extended student initiated talk, (l) indirect teacher response to student talk, and (m) direct teacher response to student talk.

H1 There are no significant differences in verbal interaction between first year teachers in Subgroup A1 who have received pre-service instruction in FIAC and first year teachers in Subgroup C1 who have not received instruction in FIAC based on the aforementioned indices.

H2 There are no significant differences in verbal interaction between second year teachers in Subgroup A2 who have received pre-service instruction in FIAC and second year teachers in Subgroup C2 who have not received instruction in FIAC based on the aforementioned indices.

H3 There are no significant differences in verbal interaction between the third year teachers in Subgroup A3 who have received pre-service instruction in FIAC and third year teachers in Subgroup C3 who have not received pre-service instruction in FIAC based on the aforementioned indices.

Tabling of Data

To communicate the results of this study, the sequence of the discussion of the hypotheses was rearranged. In this manner, all hypotheses related to a specific FIAC index were grouped together for analysis and subsequent display in a table. A total of 13 tables of data was presented to display the results of the 52 chi square tests of significance.

A basic format was followed in displaying the data in each table. The data related to each hypothesis were reported in the columns below each hypothesis listed. The subgroups were located in the table by the intersection of the letter of each group (A or C), and the number of years of teaching experience identified by the columns moving from left to right showing 0, 1, 2, and 3 years of experience respectively. The years of teaching experience corresponded to student teachers with negligible experience (0), first year teachers (1), second year teachers (2), and third year teachers (3).

The first two rows of the table displayed the observed frequencies (upper left corner of each cell), and the expected frequencies (lower right corner of each cell) for all eight subgroups. The third row of the table indicated the

result of the chi square test (X^2). The fourth row of the table reported whether or not the subgroups by years of teaching experience demonstrated significance at either the .05 level of confidence (shown by one asterisk) or at the .01 level (shown by two asterisks). The fourth row in each table presented a clear overview of the results of the tests of significance associated with the number of years of teaching experience. In this manner, the passage of time and subsequent verbal behavior of classroom teachers was placed in juxtaposition.

To obtain an overview of all the tabled data of the results of testing the 52 null hypotheses, the reader should refer to Table 14 on page 66. This table presented a graphic display of the results showing subgroups demonstrating significance at .05 level of confidence or above in indices of verbal interaction. The subgroups exhibiting the frequencies higher than expected by chance were also displayed in the table.

Index (a) Student Talk

Hypotheses $H0_a$, $H1_a$, $H2_a$, and $H3_a$ were all related to the amount of student talk recorded as frequencies in the matrix. Significant differences in verbal interaction at the .01 level of confidence were demonstrated within Subgroups A0 and C0, A1 and C1, A2 and C2, and A3 and C3. Therefore, the null hypotheses were rejected for $H0_a$, $H1_a$, $H2_a$, and $H3_a$.

Inspection of the data in Table 1 indicated the observed frequencies of student talk were higher than expected by chance in Subgroups C0, A1, C2, and C3 in the use of student talk.

Table 1

Index (a) Student Talk - $H0_a$, $H1_a$, $H2_a$, and $H3_a$

	$H0_a$	$H1_a$	$H2_a$	$H3_a$
A	2690 3442.5	5035 3891.5	4166 4350.5	3535 4267
C	4195 3442.5	2748 3891.5	4535 4350.5	4999 4267
X^2 Results	328.98	672.02	15.65	251.15
Experience/ Significance	0**	1**	2**	3**

Index (b) Teacher Talk

Hypotheses $H0_b$, $H1_b$, $H2_b$, and $H3_b$ were related to the amount of teacher talk recorded as frequencies in the matrix. Significant differences in verbal interaction at the .01 level of confidence were demonstrated within Subgroups A0 and C0, A1 and C1, A2 and C2, and A3 and C3. Therefore, the null hypotheses were rejected for $H0_b$, $H1_b$, $H2_b$, and $H3_b$.

Inspection of the data in Table 2 indicated the observed frequencies of teacher talk were higher than expected by chance in Subgroups C0, A1, A2, and C3 in the use of teacher talk.

Table 2

Index (b) Teacher Talk - $H0_b$, $H1_b$, $H2_b$, and $H3_b$

	$H0_b$	$H1_b$	$H2_b$	$H3_b$
A	6335 / 6943.5	9124 / 7647	10536 / 10136.5	5376 / 7157.5
C	7552 / 6943.5	6170 / 7647	9737 / 10136.5	8976 / 7157.5
X^2 Results	106.65	570.56	31.49	886.83
Experience/ Significance	0**	1**	2**	3**

Index (c) Content Cross

Hypotheses $H0_c$, $H1_c$, $H2_c$, and $H3_c$ were related to the amount of teacher talk recorded as frequencies in the content cross area of the matrix. Significant differences in verbal interaction at the .01 level of confidence were demonstrated within Subgroups A0 and C0, A1 and C1, A2 and C2, and A3 and C3. Therefore, the null hypotheses were rejected for $H0_c$, $H1_c$, $H2_c$, and $H3_c$.

Inspection of the data in Table 3 indicated the observed frequencies were higher than expected by chance in Subgroups C0, A1, A2, and C3 in the use of the content cross.

Table 3

Index (c) Content Cross - $H0_c$, $H1_c$, $H2_c$, and $H3_c$

	$H0_c$	$H1_c$	$H2_c$	$H3_c$
A	4774 5266	6921 5902,5	8784 8513,5	4195 5869,5
C	5758 5266	4884 5902,5	8243 8513,5	7544 5869,5
X^2 Results	91.93	351.49	17.19	477.71
Experience/ Significance	0**	1**	2**	3**

Index (d) Modified Indirect Influence

Hypotheses $H0_d$, $H1_d$, $H2_d$, and $H3_d$ were related to the amount of teacher talk in Columns 1, 2, and 3 in the matrix. A significant difference in verbal interaction was demonstrated at the .05 level of confidence within Subgroups A0 and C0, and at the .01 level for Subgroups A1 and C1, A2 and C2, and A3 and C3. Therefore, the null hypotheses were rejected for $H0_d$, $H1_d$, $H2_d$, and $H3_d$.

Inspection of the data in Table 4 indicated the observed frequencies were higher than expected by chance for Subgroups A0, A1, A2, and A3 in the use of modified indirect influence.

Table 4

Index (d) Modified Indirect Influence - $H0_d$, $H1_d$, $H2_d$, and $H3_d$

	$H0_d$	$H1_d$	$H2_d$	$H3_d$
A	1038 / 985	1648 / 1182	1278 / 1148.5	932 / 873
C	932 / 985	716 / 1182	1019 / 1148.5	814 / 873
X^2 Results	5.70	367.44	29.20	7.97
Experience/ Significance	0*	1**	2**	3**

Index (e) Modified Direct Influence

Hypotheses $H0_e$, $H1_e$, $H2_e$, and $H3_e$ were related to the amount of teacher talk in Columns 6 and 7 in the matrix. Significant differences were demonstrated at the .01 level of confidence within Subgroups A0 and C0 and A3 and C3. Therefore, the null hypotheses were rejected for $H0_e$ and $H3_e$, but accepted for $H1_e$ and $H2_e$.

Inspection of the data in Table 5 indicated the observed frequencies were higher than expected by chance for Subgroups C0 and C3 in the use of modified direct influence.

Table 5

Index (e) Modified Direct Influence - $H0_e$, $H1_e$, $H2_e$, and $H3_e$

	$H0_e$	$H1_e$	$H2_e$	$H3_e$
A	523 / 692.5	555 / 562.5	474 / 474.5	249 / 415
C	862 / 692.5	570 / 562.5	475 / 474.5	581 / 415
X^2 Results	82.98	.20	.00	132.8
Experience/ Significance	0**	1	2	3**

Index (f) Extended Use of Student Ideas

Hypotheses $H0_f$, $H1_f$, $H2_f$, and $H3_f$ related to the amount of extended use of student ideas. Significant differences were demonstrated at the .01 level of confidence within Subgroups A0 and C0, A1 and C1, A2 and C2, and A3 and C3. Therefore, the null hypotheses were rejected for $H0_f$, $H1_f$, $H2_f$, and $H3_f$.

Inspection of the data in Table 6 indicated the observed frequencies were higher than expected by chance for A0, A1, A2, and A3 in the extended use of student ideas.

Table 6

Index (f) Extended Use of Student Ideas - $H0_f$, $H1_f$, $H2_f$, and $H3_f$

	$H0_f$	$H1_f$	$H2_f$	$H3_f$
A	235 169.5	228 165.5	180 129	237 192
C	104 169.5	103 165.5	78 129	147 192
X^2 Results	50.62	47.21	40.33	21.10
Experience/ Significance	0**	1**	2**	3**

Index (g) Extended Criticism

Hypotheses $H0_g$, $H1_g$, $H2_g$, and $H3_g$ were related to the amount of criticism used by the teacher. Significant differences were demonstrated at the .01 level of confidence within Subgroups A1 and C1, and A3 and C3. Therefore, the null hypotheses were rejected for $H1_g$ and $H3_g$, but accepted for $H0_g$ and $H2_g$.

Inspection of the data in Table 7 for subgroups having significant differences indicated the observed frequencies were higher than expected by chance for Subgroups C1 and C3 in the use of extended criticism.

Table 7

Index (g) Extended Criticism - $H0_g$, $H1_g$, $H2_g$, and $H3_g$

	$H0_g$	$H1_g$	$H2_g$	$H3_g$
A	85 86.5	6 19	35 32	6 31.5
C	88 86.5	32 19	29 32	57 31.5
X^2 Results	.05	17.79	.56	41.29
Experience/ Significance	0	1**	2	3**

Index (h) Student Response to a Teacher Question

Hypotheses $H0_h$, $H1_h$, $H2_h$, and $H3_h$ were related to the amount of student response to a teacher question. Significant differences at the .01 level of confidence were demonstrated within Subgroups A1 and C1, A2 and C2, and A3 and C3. Therefore, the null hypotheses were rejected for $H1_h$, $H2_h$, and $H3_h$, but accepted for $H0_h$.

Inspection of the data in Table 8 for subgroups exhibiting significant differences indicated the observed frequencies were higher than expected by chance for the Subgroups A1, A2, and C3 on the student response to a teacher question index.

Table 8

Index (h) Student Response to a Teacher Question - $H0_h$, $H1_h$, $H2_h$, and $H3_h$

	$H0_h$	$H1_h$	$H2_h$	$H3_h$
A	889 906	1467 1091.5	1301 1142.5	625 742
C	923 906	716 1091.5	984 1142.5	859 742
X^2 Results	.64	258.36	43.98	36.90
Experience/ Significance	0	1**	2**	3**

Index (i) Student Initiated Talk Following a Teacher Question

Hypotheses $H0_i$, $H1_i$, $H2_i$, and $H3_i$ were related to the amount of student initiated talk following a question. A significant difference at the .01 level of confidence was demonstrated within Subgroups A1 and C1. A significant difference at the .05 level of confidence was demonstrated within Subgroups A2 and C2. Therefore, the null hypotheses were rejected for $H1_i$ and for $H2_i$.

Inspection of the data in Table 9 for the subgroups exhibiting significant differences indicated the observed frequencies were higher than expected by chance for Subgroups A1 and A2 in the use of student initiated talk following a teacher question.

Table 9

Index (i) Student Initiated Talk Following a Teacher Question - $H0_i$, $H1_i$, $H2_i$, and $H3_i$

	$H0_i$	$H1_i$	$H2_i$	$H3_i$
A	17 22.5	74 48	45 35	30 32
C	28 22.5	22 48	25 35	34 32
X^2 Results	2.7	28.17	5.71	.25
Experience/ Significance	0	1**	2*	3

Index (j) Transition from a Student Response to Student Initiated Talk

Hypotheses $H0_j$, $H1_j$, $H2_j$, and $H3_j$ were related to the number of transitions from a student response to student initiated talk. A significant difference at the .05 level of confidence was demonstrated within Subgroups A0 and C0. Therefore, the null hypothesis was rejected for $H0_j$, but accepted for hypotheses $H1_j$, $H2_j$, and $H3_j$.

Inspection of the data in Table 10 for the subgroups exhibiting significant differences indicated the observed frequencies were higher than expected by chance for Subgroup C0 in the transition from student response to student initiated talk.

Table 10

Index (j) Transition from a Student Response to Student Initiated Talk - $H0_j$, $H1_j$, $H2_j$, and $H3_j$

	$H0_j$	$H1_j$	$H2_j$	$H3_j$
A	10 16.5	26 23.5	20 24.5	46 47
C	23 16.5	21 23.5	29 24.5	48 47
X^2 Results	5.12	.53	1.65	.04
Experience/ Significance	0*	1	2	3

Index (k) Extended Student Initiated Talk

Hypotheses $H0_k$, $H1_k$, $H2_k$, and $H3_k$ were related to the amount of extended student initiated talk. Significant differences at the .01 level of confidence were demonstrated within Subgroups A0 and C0, A1 and C1, and A2 and C2. Therefore, the null hypotheses were rejected for $H0_k$, $H1_k$, and $H2_k$, but accepted for $H3_k$.

Inspection of the data in Table 11 for the subgroups exhibiting significant differences indicated the frequencies were higher than expected by chance in Subgroups C0, A1, and C2 for the use of extended student initiated talk.

Table 11

Index (k) Extended Student Initiated Talk - $H0_k$, $H1_k$, $H2_k$, and $H3_k$

	$H0_k$	$H1_k$	$H2_k$	$H3_k$
A	295 466.5	585 466	689 862	1259 1297
C	638 466.5	347 466	1035 862	1335 1297
X^2 Results	126.10	60.78	69.44	2.23
Experience/ Significance	0**	1**	2**	3

Index (I) Indirect Teacher Response to Student Talk

Hypotheses $H0_I$, $H1_I$, $H2_I$, and $H3_I$ were all related to the amount of indirect teacher responses to student talk. Significant differences at the .01 level of confidence were demonstrated within Subgroups A1 and C1 and A2 and C2. Therefore, the null hypotheses were rejected for $H1_I$ and $H2_I$, but accepted for $H0_I$ and $H3_I$.

Inspection of the data in Table 12 for the subgroups exhibiting significant differences indicated the frequencies were higher than expected by chance in Subgroups A1 and A2 for the use of indirect teacher response to student talk.

Table 12

Index (I) Indirect Teacher Response to Student Talk - $H0_I$, $H1_I$, $H2_I$, and $H3_I$

	$H0_I$	$H1_I$	$H2_I$	$H3_I$
A	1035 1071.5	1814 1284.5	1385 1270.5	893 918.5
C	1108 1071.5	755 1284.5	1156 1270.5	944 918.5
X^2 Results	2.49	436.54	20.64	1.42
Experience/ Significance	0	1**	2**	3

Index (m) Direct Teacher Response to Student Talk

Hypotheses $H0_m$, $H1_m$, $H2_m$, and $H3_m$ were related to the amount of direct teacher response to student talk. Significant differences at the .01 level of confidence were demonstrated within Subgroups A0 and C0, A1 and C1, and A3 and C3. Therefore, the null hypotheses were rejected for $H0_m$, $H1_m$, and $H3_m$, but accepted for $H2_m$.

Inspection of the data in Table 13 for the subgroups exhibiting significant differences indicated the frequencies were higher than expected by chance in Subgroups C0, A1, and C3 for use of direct teacher response to student talk.

Table 13

Index (m) Direct Teacher Response to Student Talk - $H0_m$, $H1_m$, $H2_m$, and $H3_m$

	$H0_m$	$H1_m$	$H2_m$	$H3_m$
A	309 366	576 452	438 434.5	224 384
C	423 366	328 452	431 434.5	544 384
X^2 Results	17.75	68.04	.056	133.33
Experience/ Significance	0**	1**	2	3**

In Table 14, the overview of statistical tests are shown. Of the total 52 null hypotheses, 38 were rejected and 14 accepted at the .05 level of confidence and above.

Table 14

Subgroups Demonstrating Significance at .05 or Above with a Frequency Higher than Expected by Chance

Index	Description	0	1	2	3
a	Student Talk		■		
b	Teacher Talk		■	■	
c	Content Cross		■	■	
d	Modified Indirect Influence	■	■	■	■
e	Modified Direct Influence		▨	▨	
f	Extended Use of Student Ideas	■	■	■	■
g	Extended Criticism	▨		▨	
h	Student Response to a Teacher Question	▨	■	■	
i	Student Initiated Talk Following a Teacher Question	▨	■	■	▨
j	Transition from a Student Response to Student Initiated Talk		▨	▨	▨
k	Extended Student Initiated Talk		■		▨
l	Indirect Teacher Response to Student Talk	▨	■	■	▨
m	Direct Teacher Response to Student Talk			▨	

■ Significant at the .05 level of confidence or above with frequencies higher than expected by chance for subgroups in Group A based on years of teaching experience.

□ Significant at the .05 level of confidence or above with frequencies higher than expected by chance for subgroups in Group C based on years of teaching experience.

▨ Not significant at the .05 level of confidence or above for subgroups in Groups A or C.

FIAC RATIOS

The FIAC ratios for Groups A and C were compared within subgroups in tabled form. The following questions were stated in Chapter 1 and are also stated below.

Q_1 What difference, if any, will exist in the value of the I/D ratio within the subgroups paired on the basis of number of years of teaching experience?

Q_2 What difference, if any, will exist in the value of the i/d ratio within subgroups paired on the basis of number of years of teaching experience?

Q_3 What difference, if any, will exist in the value of the teacher talk-student talk ratio within subgroups paired on the basis of number of years of teaching experience?

Q_4 What difference, if any, will exist in the value of the indirect teacher response to direct teacher response ratio within subgroups paired on the basis of number of years of teaching experience?

Question 1: I/D Ratio

The I/D ratio was calculated by dividing Columns 1 through 4, representing indirect influence, by Columns 5 through 7, representing direct influence. An I/D ratio of 1 indicated for every indirect statement there was one direct statement.

Since all of the values of the ratios were less than 1, all of the student teachers and teachers were in a direct teaching mode. However, a comparison of the I/D ratios within the subgroups indicated the subgroups in Group A were closer to an indirect teaching style than the corresponding subgroups in Group C. These higher I/D values are underlined for emphasis in Table 15 below.

Table 15

I/D Ratio Values by Subgroups and Years of Teaching Experience

Group	0	1	2	3
A	.75	.85	.55	.65
C	.58	.50	.41	.40

Question 2: i/d Ratio

The i/d ratio was computed by dividing Columns 1 through 3 by Columns 6 and 7. In this ratio, Column 4 (asking questions) was eliminated from the indirect influence area in the matrix, and Column 5 (lecture) was eliminated from the direct influence area of the matrix. Consequently, the i/d ratio reflected whether the teacher was indirect or direct as an approach to motivation and control. A ratio value of 1 indicated equal emphasis; a ratio value of 2 showed twice as much indirect teaching influence.

In Table 16, the highest ratio value within each pair of subgroups was underlined. The i/d ratios in all such comparisons were higher for the subgroups in Group A and, therefore, in a more indirect teaching mode.

Table 16

i/d Ratio Values by Subgroups and Years of Teaching Experience

Group	0	1	2	3
A	1.98	2.97	2.70	3.70
C	1.08	1.26	2.15	1.40

Question 3: Teacher Talk-Student Talk Ratio

The ratio was calculated by dividing the teacher talk (Columns 1 through 7) by student talk, Columns 8 and 9. A ratio of 1 indicated teacher talk was equal to the amount of student talk. A ratio of 2 indicated twice as much teacher talk. Inspection of the data showed higher teacher talk than student talk in all subgroups.

Based on Table 17, the underlined ratio values for each pair of subgroups demonstrated higher ratio values for Subgroups A0, C1, C2, and C3. In this case, the higher ratio values were indicative of direct teaching influence. Subgroups C0, A1, C2, and A3 appeared to exhibit teaching behavior more consistent with indirect influence based on lower ratio values. Neither Groups A or C demonstrated consistently higher ratio values across all levels of teaching experience.

Table 17

Teacher Talk-Student Talk Ratio by Subgroups and Years of Teaching Experience

Group	0	1	2	3
A	2.36	1.81	2.53	1.52
C	1.80	2.25	2.15	1.79

Question 4: Indirect Teacher Response to Direct Teacher Response Ratio

This ratio reflected the amount of indirect teacher response to student talk in contrast to the amount of direct teacher response to student talk. A ratio of 1 indicated a balance between the indirect and direct influence; a ratio higher than 1 showed the teacher utilized more indirect response to student talk.

In Table 18, a comparison of this ratio within the subgroups indicated all the subgroups in Group A demonstrated a more indirect response to student talk than the corresponding paired subgroups in Group C.

FIAC Ratio Results

A summary of the results of comparing Groups A and C on the four ratios is shown in Table 19. With the exception of first and third year teachers in Group A on the teacher talk-student talk ratio, all the subgroups in Group A demonstrated ratio values more indicative of indirect teaching than the corresponding subgroups in Group C.

Table 18

Indirect Teacher Response to Direct Teacher Response Ratio by Subgroups and Years of Teaching Experience

Group	0	1	2	3
A	3.35	3.15	3.16	3.99
C	2.62	2.30	2.68	1.74

Table 19

Subgroups Exhibiting Higher Ratio Values than Corresponding Subgroups by Years of Teaching Experience

Question	Description	0	1	2	3
I/D Ratio	Higher ratio indicated more indirect influence	■	■	■	■
i/d Ratio	Higher ratio indicated more indirect influence	■	■	■	■
Teacher Talk-Student Talk Ratio	Higher ratio indicated less student verbal participation	■	□	■	□
Indirect Teacher Response to Direct Teacher Response Ratio	Higher ratio indicated more indirect influence	■	■	■	■

■ Higher ratio values of Group A subgroups

□ Higher ratio values of Group C subgroups

SUMMARY

In Chapter 4, the first section contained a description of the findings related to the 52 null hypotheses concerning the verbal interaction of Groups A and C on 13 specified FIAC indices. Of the total 52 null hypotheses, 38 were rejected and 14 accepted at the .05 level of confidence or above.

The second section of the chapter contained results of the calculation of four ratios. Group A exhibited higher ratios on all of the following: I/D Ratio, i/d Ratio, and the Indirect Teacher Response to Direct Teacher Response Ratio. With regard to the Teacher Talk-Student Talk Ratio, the Subgroups A0, C1, A2, and C3 demonstrated higher ratios than the corresponding paired subgroups.

Chapter 5

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

SUMMARY

A review of the literature revealed a paucity of research investigating the effects of pre-service instruction in FIAC beyond the initial teaching behaviors in student teaching. The purpose of this study was to determine whether differences in verbal interaction existed between a group with pre-service instruction in FIAC and a comparison group without such instruction based on specified FIAC indices and ratios. This latitudinal research study examined the relationship between pre-service instruction in FIAC and the verbal interaction of student teachers and first, second, and third year teachers. The research was funded by a grant from the U. S. Office of Education.

Group A consisted of student teachers and first, second, and third year teachers who had received 13 clock hours of pre-service instruction in FIAC at Peru State College, Peru, Nebraska. Group C consisted of non-Peru State College student teachers and first, second, and third year teachers who had not received pre-service instruction in FIAC. Each subgroup was identified by letter (A or C) and a corresponding number (0, 1, 2, and 3) to represent years of teaching experience.

Of the 128 participants who agreed to tape record their classroom activities, 35 did not return the audiotapes. Therefore, the number of persons participating in each subgroup was as follows: A0 (9), A1 (14), A2 (14), A3 (8), C0 (11), C1 (9), C2 (15), and C3 (13). A total of 45 participants served in Group A and 48 in Group C.

A total of 60 minutes of classroom verbal interaction for each participant was coded and placed in matrices for comparison purposes. Chi square tests were performed on 52 null hypotheses to determine whether the subgroups exhibited significant differences regarding the 13 FIAC indices. In addition, four ratios were compared within each pair of subgroups to obtain an indication of direct or indirect teaching influence.

Of the total 52 null hypotheses stated, 35 were rejected at the .01 level of confidence; 3 rejected at the .05 level of confidence; and 14 were accepted. The findings which follow are based on inspection of subgroups having frequencies higher than expected by chance. Except as otherwise noted, all the indices discussed were based on rejection of the null hypotheses at the .01 level of confidence. Adjacent to each index name is an identification of the corresponding hypothesis symbol in parentheses. The prefix to all FIAC index letters identified the hypotheses related to the years of teaching experience: H0 (student teachers), H1 (first year teachers), H2 (second year teachers), and H3 (third year teachers).

Null Hypotheses Rejected

Of the 52 null hypotheses, 38 were rejected at the .05 level of confidence or above for student teachers and first, second, and third year teachers regarding the FIAC indices.

Student teachers. Student teachers in Subgroup A0 demonstrated higher frequencies than expected by chance in modified indirect influence ($H0_d$ @ .05 level) and extended use of student ideas ($H0_f$). Student teachers in Subgroup C0 exhibited higher frequencies than expected by chance in student talk ($H0_a$), teacher talk ($H0_b$), content cross ($H0_c$), modified direct influence ($H0_e$), transition from a student response to student initiated talk ($H0_i$ @ .05 level), extended student initiated talk ($H0_k$), and direct teacher response to student talk ($H0_m$).

First year teachers. First year teachers in Subgroup A demonstrated higher frequencies than expected by chance in student talk ($H1_a$), teacher talk ($H1_b$), content cross ($H1_c$), modified indirect influence ($H1_d$), extended use of student ideas ($H1_f$), student response to a teacher question ($H1_h$), student initiated talk following a teacher question ($H1_i$), extended student initiated talk ($H1_k$), and indirect teacher response to student talk ($H1_l$). First year teachers in Subgroup C exhibited higher frequencies than expected by chance in extended criticism ($H1_g$) and direct teacher response to student talk ($H1_m$).

Second year teachers. Second year teachers in Subgroup A2 demonstrated higher frequencies than expected by chance in teacher talk ($H2_b$), content cross ($H2_c$), modified indirect influence ($H2_d$), extended use of student ideas ($H2_f$), student response to a teacher question ($H2_h$), student initiated talk following a teacher question ($H2_i$ @ .05 level), and indirect teacher response to student talk ($H2_l$). Second year teachers in Subgroup C2 exhibited higher frequencies than expected by chance in student talk ($H2_a$) and extended student initiated talk ($H2_k$).

Third year teachers. Third year teachers in Subgroup A3 demonstrated higher frequencies than expected by chance in modified indirect influence ($H3_d$) and extended use of student ideas ($H3_f$). Third year teachers in Subgroup C3 exhibited higher frequencies than expected by chance in student talk ($H3_a$), teacher talk ($H3_b$), content cross ($H3_c$), modified indirect influence ($H3_d$), extended criticism ($H3_g$), student response to a teacher question ($H3_h$), and direct teacher response to student talk ($H3_m$).

Null Hypotheses Accepted

Of the 52 null hypotheses, 14 were accepted for student teachers and first, second, and third year teachers regarding the FIAC indices.

Student teachers. For student teachers, the null hypothesis was accepted regarding extended criticism ($H0_g$), student response to a teacher question ($H0_h$),

student initiated talk following a teacher question ($H0_i$), and indirect teacher response to student talk ($H0_l$).

First year teachers. For first year teachers, the null hypothesis was accepted concerning modified direct influence ($H1_e$) and transition from a student response to student initiated talk ($H1_i$).

Second year teachers. For second year teachers, the null hypothesis was accepted regarding modified direct influence ($H2_e$), extended criticism ($H2_g$), transition from a student response to student initiated talk ($H2_i$), and direct teacher response to student talk ($H2_m$).

Third year teachers. For third year teachers, the null hypothesis was accepted for student initiated talk following a teacher question ($H3_i$), transition from a student response to student initiated talk ($H3_i$), extended student initiated talk ($H3_k$), and indirect teacher response to student talk ($H3_l$).

Although difficult to identify any consistent trends across the subgroups, it should be noted that subgroups in Group A consistently were more in the indirect mode in all four years of teaching for the two indices: Modified indirect influence and extended use of student ideas. These two indices were the only ones which showed a consistent pattern. The other indices indicated mixed results in terms of persistence of utilization of indirect behaviors. One trend developed for Group C for three out of the four years of experience was

more direct teacher response to student talk and more student talk in classrooms of teachers in Group C.

A trend of persistence of verbal interaction behavior was demonstrated in three of the four ratios calculated. The I/D ratio indicated Group A was consistently more indirect when compared with the corresponding ratio values of the corresponding subgroups in Group C. The ratio values were as follows: A0 (.75), C0 (.58), A1 (.85), C1 (.50), A2 (.55), C2 (.41), A3 (.65), and C3 (.40). Although Group A had a consistent pattern of comparatively more indirect influence, the actual values were still in the direct mode (a ratio value of 1 was needed to indicate a balance between indirect and direct influence in the classroom).

The i/d ratio reflected whether the teacher was indirect or direct as an approach to motivation and control. In all cases, the ratio values in Group A were higher indicating indirect influence. The values were as follows: A0 (1.98), C0 (1.08), A1 (2.97), C1 (1.26) A2 (2.70), C2 (2.15), A3 (3.70), and C3 (1.40). Based on the ratio values, the indirect values showed a trend of increasing ratio values (more indirect influence) for each additional year of teaching experience.

Another ratio demonstrating consistently higher ratio values for Group A in the indirect mode was the indirect teacher response to direct teacher response ratio. The ratio values were: A0 (3.35), C0 (2.62), A1 (3.15), C1 (2.30), A2 (3.16), C2 (2.68), A3 (3.99), and A2 (1.74). A consistent indirect response

mode from student teaching continuing through the third year of teaching was established for subgroups in Group A.

For the teacher talk–student talk ratio, the higher the ratio value, the lower the student participation in the classrooms. The following ratio values were established: A0 (2.36), C0 (1.80), A1 (1.81), C1 (2.25), A2 (2.53), C2 (2.15), A3 (1.52), and C3 (1.79). From the perspective of more verbal participation by students in the classroom (lower ratio values), first and third year teachers in Group A had classrooms with more student participation. No consistent trend was established based on the teacher talk–student talk ratio.

CONCLUSIONS

Within the limitations inherent in an ex post facto field study, the findings of this investigation indicated a positive relationship exists between pre–service instruction in FIAC and subsequent verbal interaction during student teaching and first, second, and third years of teaching experience. Of 52 null hypotheses tested, all but 14 were rejected at the .05 level of confidence or above. Therefore, it was concluded pre–service instruction in FIAC makes a difference in the nature of the verbal interaction of teachers in the classroom.

Based on the findings of 13 FIAC indices, it was concluded few persistent trends could be identified demonstrating a consistent difference (either direct or indirect) continuing from student teaching through the third year of teaching experience. However, student teachers and first, second, and third year

teachers with pre-service instruction in FIAC consistently utilized more modified indirect influence, and more extended use of student ideas. In contrast, the comparison group in the respective subgroups exhibited more direct teacher response to student talk (with the exception of second year teachers) and more student talk (with the exception of first year teachers).

Based on the findings of the FIAC ratios, it was concluded student teachers and first, second, and third year teachers with pre-service instruction in FIAC consistently exhibited more indirect verbal behavior. With the exception of the results of the teacher talk-student talk ratio, the student teachers and teachers with pre-service instruction in FIAC consistently demonstrated higher ratio values on the I/D ratio, i/d ratio, and indirect teacher response to direct teacher response ratio than teachers without FIAC pre-service instruction with comparable years of teaching experience.

IMPLICATIONS

For a teacher education institution with a goal of producing more indirect teachers, the results of this research offer some evidence that a positive relationship exists between instruction in FIAC and subsequent indirect verbal interaction in the classroom. If this goal is deemed desirable by a teacher institution, the institution should consider the merits of introducing FIAC as an innovation into the pre-service teacher education program.

If the indirect teaching mode is desirable, in-service instruction in FIAC should be offered by teacher education institutions to help teachers sustain

specific manifestations of indirect influence in the respective indices or to increase the magnitude of the indirectness.

RECOMMENDATIONS

Since this project was an ex post facto field study, experimental studies should be developed to substantiate the findings of this study. Rather than a latitudinal research design, it is recommended a longitudinal design be utilized to place the effects of the passage of time into a more realistic perspective.

This follow-up approach utilized a procedure in between a questionnaire and an actual on-site visitation by college personnel of graduates teaching in their classrooms. This approach provides one potential means of conforming to the new standards of AACTE to follow-up teacher education graduates.

Although attrition occurred across all subgroups, the approach of utilizing audiotapes as a means of conducting follow-up studies has merit. The audiotapes could be mailed to graduates to tape record their verbal interaction in the classroom. Upon return by mail, the audiotapes could be coded and interpreted each year by students who have received pre-service instruction in FIAC and have established sufficient coding reliability. This activity would provide data for the teacher education institution, enable the pre-service student to practice FIAC skills, and provide the prospective teacher with insights into actual classroom practice while coding the classroom behavior.

The matrices of the data of randomly selected graduates could be saved each year to serve as the source for a data bank among institutions. With the

data, long term longitudinal studies could be initiated to study the teaching behaviors of graduates in the field.

REFERENCES

American Association of Colleges for Teacher Education. 1971. Recommended Standards for Teacher Education. Washington, D.C.: American Association of Colleges for Teacher Education.

Amidon, Edmund J. 1967. "The Use of Interaction Analysis at Temple University." In The Study of Teaching, edited by Dean Corrigan, pp. 42-54. Washington, D.C.: The Association for Student Teaching.

Amidon, Edmund J. and Ned A. Flanders. 1971. A Manual for Understanding and Improving Teacher Classroom Behavior. Minneapolis: Association for Productive Teaching.

Anderson, Harold H. 1939. "Domination and Social Integration in the Behavior of Kindergarten Children and Teachers." In Vol. 21, No. 3, Genetic Psychology Monographs, edited by Carl Murchison (August): 287-385.

Bailey, Gerald Douglas. 1972. A Study of Classroom Interaction Patterns from Student Teaching to Independent Classroom Teaching. Lincoln: University of Nebraska, unpublished doctoral dissertation.

Bales, Robert F. 1950. Interaction Process Analysis. Cambridge: Addison-Wesley Press, Inc.

Barr, Arvil S. et al 1953. "Second Report of the Committee on Criteria of Teacher Effectiveness." Journal of Educational Research (May): 641-658.

Bosch, Albert C. 1972. Relationships of Teaching Patterns to Indices of Classroom Verbal Behavior: A Further Analysis and Synthesis of Classroom Verbal Interaction Data Using Descriptive Indices of Behavior and Teaching Pattern Analysis. New York: New York University, unpublished doctoral dissertation.

Campbell, James Reed and Cyrus W. Barns. 1969. "Interaction Analysis - A Breakthrough." Phi Delta Kappa (June):587-590.

Cornell, Dr. Terry D. 1973. A Manual for Utilizing the Interaction Analysis Observation System. Tucson: Educational Innovators Press.

Downie, N. M. and Robert W. Heath. 1965. Basic Statistical Methods. New York: Harper & Row.

Dunkin, Michael J. and Bruce J. Biddle. 1974. The Study of Teaching. New York: Holt, Rinehart, and Winston, Inc.

Finske, Sister M. Joanice. 1967. The Effect of Feedback Through Interaction Analysis on the Development of Flexibility in Student Teachers. Ann Arbor: University of Michigan, unpublished doctoral dissertation.

Flanders, Ned A. 1963. Helping Teachers Change Their Behavior. Ann Arbor: University of Michigan, School of Education.

Flanders, Ned A. 1965. Teacher Influence, Pupil Attitudes, and Achievement. Cooperative Research Monograph, No. 11, U.S. Office of Education. Washington, D.C.: U.S. Government Printing Office.

Flanders, Ned A. 1970. Analyzing Teacher Behavior. Reading: Addison-Wesley Publishing Company, Inc.

Furst, Norma. 1967. "The Effects of Training in Interaction Analysis on the Behavior of Student Teachers in Secondary Schools." In Interaction Analysis: Theory, Research, and Application, edited by Edmund J. Amidon and John B. Hough, pp. 315-328. Reading: Addison-Wesley Publishing Company, Inc.

Furst, Norma and Russell A. Hill. 1971. "Systematic Classroom Observation." In Vol. 2, The Encyclopedia of Education, edited by Lee C. Deighton, pp. 168-183. New York: The MacMillan Company and The Free Press.

Gage, N. L. and Philip H. Winne. 1975. "Performance-Based Teacher Education." In Chapter VI, Teacher Education, edited by Kevin Ryan, pp. 146-172. The Seventy-Fourth Yearbook of the National Society for the Study of Education, Part II. Chicago: The University of Chicago Press.

Gellman, Richard Arthur. 1968. A Follow-Up Study on the Use of Interaction Analysis in the Training of Prospective Teachers. Philadelphia: Temple University, unpublished doctoral dissertation.

Greenberg, Betty Selma. 1970. Selected Studies of Classroom Teaching: A Comparative Analysis. Scranton: International Textbook Company.

Halley, Gregoria Nardi. 1974. Cooperating Teachers' Effect on Student Teachers' Verbal Behaviors: A Flanders System Approach. Eugene: University of Oregon, unpublished doctoral dissertation.

Horn, Ernest. 1914. Distribution of Opportunity for Participation Among the Various Pupils in Class-Room Recitations. New York: Teachers College, Columbia University.

Johnson, James A. 1968. A National Survey of Student Teaching Programs. Final Report, Cooperative Research Project No. 6-8182, U.S. Office of Education, Northern Illinois University. Baltimore: Multi-State Teacher Education Project.

Kirk, Jeffery. 1964. Effects of Learning the Minnesota System of Interaction Analysis by Student Teachers of Intermediate Grades. Philadelphia: Temple University, unpublished doctoral dissertation.

Lewis, George Thomas. 1974. The Effects of Training Student Teachers in the Use of Interaction Analysis. Philadelphia: Temple University, unpublished doctoral dissertation.

Lippitt, Ronald and Ralph K. White. 1943. "The 'Social Climate' of Children's Groups." In Child Behavior and Development, edited by Roger G. Barker, Jacob S. Kounin, and Herbert F. Wright, pp. 485-508. New York: McGraw-Hill Book Company, Inc.

Lohman, Ernest Eugene. 1966. A Study of the Effect of Pre-Service Training in Interaction Analysis on the Verbal Behavior of Student Teachers. Columbus: Ohio State University, unpublished doctoral dissertation.

Lohman, Ernest E., Richard Ober, and John B. Hough. 1967. "A Study of the Effect of Pre-Service Training in Interaction Analysis on the Verbal Behavior of Student Teachers." In Interaction Analysis: Theory, Research, and Application, edited by Edmund J. Amidon and John B. Hough, pp. 346-359. Reading: Addison-Wesley Publishing Company, Inc.

McClellan, James E. 1971. "Classroom-Teaching Research: A Philosophical Critique." In Research into Classroom Processes: Recent Developments and Next Steps, edited by Ian Westbury and Arno A. Bellack, pp. 3-15. New York: Teachers College Press.

McLeod, Richard J. 1967. "Changes in the Verbal Interaction Patterns of Secondary Teachers who have had Training in Interaction Analysis and the Relationship of these Changes to the Verbal Interaction of their Cooperating Teachers. Final Report." ERIC:ED 015 148. Utica: Cornell University.

Medley, Don M. and Harold E. Mitzel. 1963. "Measuring Classroom Behavior by Systematic Observation." In Handbook of Research on Teaching, edited by N. L. Gage, pp. 247-328. Chicago: Rand McNally.

Merril, Edward C., Jr. 1967. Professional Student Teaching Programs. Danville: The Interstate Printers and Publishers, Inc.

Nebraska State Department of Education. 1971. Nebraska Educational Directory. Lincoln: Department of Education.

Openshaw, Karl M. 1968. "Research in Teaching." In Partnership in Teacher Education, edited by E. Brooks Smith, Hans C. Olsen, Patrick J. Johnson, and Chandler Barbour, pp. 193-210. Washington, D.C.: American Association of Colleges for Teacher Education.

Parrish, H. Wayne. 1968. A Study of the Effects of In-Service Training in Interaction Analysis on the Verbal Behavior of Experienced Teachers. Eugene: University of Oregon, unpublished doctoral dissertation.

Peck, Robert F. 1971. "Prompting Self-Disciplined Learning: A Researchable Revolution." In Research in Teacher Education: A Symposium, edited by B. Othaniel Smith, pp. 73-81. Englewood Cliffs: Prentice-Hall, Inc.

Pomeroy, Edward C. 1972. Beyond the Upheaval. Washington, D.C.: American Association of Colleges for Teacher Education.

Puckett, Roswell C. 1928. "Making Supervision Objective." The School Review 36 (March):209-212.

Sandefur, J. T. et al 1969. Teaching Experience as a Modifier of Teaching Behavior. Emporia: Kansas State Teachers College.

Sandefur, J. T. 1970. An Illustrated Model for The Evaluation of Teacher Education Graduates. Washington, D.C.: American Association of Colleges for Teacher Education.

Simon, Anita and E. Gil Boyer. n.d. Technical Tools for Teaching. Philadelphia: Research for Better Schools, Inc.

Simon, Anita and E. Gil Boyer. 1970. Mirrors for Behavior II: An Anthology of Observation Instruments, Volume A. Philadelphia: Research for Better Schools, Inc.

Stevens, Romiett. 1912. The Question as a Measure of Efficiency in Instruction: A Critical Study of Class-Room Practice. Teachers College, Columbia University, Contributions to Education, No. 48. New York: Teachers College Press.

Thomas, Dorothy Swaine et al 1929. Some New Techniques for Studying Social Behavior. New York: Teachers College, Columbia University.

Turner, Richard L. 1975. "An Overview of Research in Teacher Education." In Chapter IV, Teacher Education, edited by Kevin Ryan, pp. 87-110. The Seventy-Fourth Yearbook of the National Society for the Study of Education. Chicago: The University of Chicago.

Unruh, Glenys G. and William M. Alexander. 1970. Innovations in Secondary Education. New York: Holt, Rinehart, and Winston, Inc.

Von Haden, Herbert I. and Jean Marie King. 1971. Innovations in Education: Their Pros and Cons. Worthington: Charles A. Jones Publishing Company.

Wilhelms, Fred T. 1973. Supervision in a New Key. Washington, D.C.: Association for Supervision and Curriculum Development.

Wise, John Edward, Robert B. Nordberg, and Donald J. Reitz. 1967. Methods of Research in Education. Washington, D.C.: D. C. Heath & Co.

Withall, John. 1967. "The Development of a Technique for the Measurement of Social-Emotional Climate in Classrooms." In Interaction Analysis: Theory, Research, and Application, edited by Edmund J. Amidon and John B. Hough, pp. 47-64. Reading: Addison-Wesley Publishing Company, Inc.

Woodruff, Asahel D. 1968. "Accreditation by Evaluation of the Product: What It Means for Teacher Education Programs." In Teacher Education: Issues and Innovations, pp. 237-245. 1968 Yearbook. Washington, D.C.: American Association of Colleges for Teacher Education.

APPENDIX A.

PRE-SERVICE FIAC INSTRUCTION

CLASSROOM INTERACTION ANALYSIS

Division of Education
2nd Semester, 1968-69

The following procedure is suggested for developing your skill as a classroom teacher utilizing Flanders' program for self-improvement.

PHASE I

Orientation	Feb. 3, 4, & 5	Filmstrip/tape recordings

PHASE II

Skill Development and Interpretation	Monday, Feb. 10	Recording Matrix Construction and Analysis

PHASE III

Achieving Closure and Expertise	Arranged	Small group instructions and Independent Study

PHASE IV

Behavior Modification	During student teaching	Self-analysis of own teaching

During the filmstrip/tape recording sessions, you should:

1. Commit the ten categories to memory.
2. Determine rationale in development of the categories for interaction analysis (Psychological--learning bases).
3. Determine the hypothesis upon which the system is based.
4. Determine the % of frequencies within each category.
5. Develop skill in recording classroom sequence of events.
6. Complete a matrix and interpret your findings.
7. Compare results with matrix provided.
8. Practice recording skills utilizing tapes in the Instructional Reserve Center, Room 202 - Education Building.

Note: Two or more persons should record together, comparing results.

(Course handout - Feb. 1969)

BEHAVIORAL OBJECTIVES OF STUDENTS INTRODUCED TO INTERACTION ANALYSIS

A. Training Period

1. List accurately with 100% efficiency the ten categories in Flanders' system.

2. Record with a minimum r of .55 when compared to a model, the classroom interaction from a tape recording.

3. Analyze and interpret a completed matrix, drawing conclusions from:

   a. ID ratio
   b. Steady state cells
   c. Content cross
   d. Indirect influence
   e. Direct influence and
   f. Sequence of predictable events, this is cause-effect influence of the teacher.

4. Accept or reject hypotheses tested, drawing conclusions similar to a trained observer.

B. Student Teaching

1. Utilization of Interaction Analysis as a means of self-evaluation during student teaching.

2. Modification of teaching behavior based upon information obtained through analysis and interpretation of verbal behavior in classroom.

C. Teacher/Long Range Goals

1. Develop an experimental attitude toward teaching as evidenced by different classroom techniques.

2. Encouraging and participating in teacher self-evaluation.

3. Exhibiting those qualities as a teacher which encourages freedom for the student.

(Course handout - Feb. 1969)

APPENDIX B.

PARTICIPANT PROCEDURAL CHECKLIST

PERU STATE COLLEGE
PERU, NEBRASKA 68421

Spring, 1972

Dear Teacher,

Thank you for your interest in participating in the study of PSC student teachers and graduates. Please utilize the following checklist in making the audio tapes.

Preparation for Taping

___Locate a cassette tape recorder available from your school.
___Experiment with the location of the tape recorder to ensure a quality audio tape of classroom activity.
___Conduct trial uses of the recorder so that you and the students can become accustomed to a classroom situation involving a tape recorder.

Taping Instructions

___Tape record five twenty minute sessions of classroom activity. Record one twenty minute session on each side of each tape.
___Tape record the twenty minute sessions during informal discussions, review of subject matter, teacher directed discussion, or introduction of new material. An opportunity for verbal communication between you and the student must exist.
___Be sure to record the subject _____ and grade level ____.

Inappropriate Taping Situations

___Avoid taping situations involving reading, independent study, workbook assignments or commercially prepared film, filmstrip, or ITV presentations.
___Discard a tape and repeat the procedure if the tape is not representative of instruction because of some unusual occurrence or if the audio quality is poor.

Return of Cassette Tapes

___Attach the address label and stamps to the original envelope and return the tapes no later than April 14, 1972.

Thank you for your cooperation.

Sincerely,

Eldon Smith

Eldon Smith, Researcher
Follow-up Study
Peru State College

APPENDIX C.

MATRICES FOR GROUPS AND SUBGROUPS

Table 20

Grand Matrix for Group A (Peru State College)
with Pre-Service Instruction in FIAC

Category	1	2	3	4	5	6	7	8	9	10
1										
2		*	.1	.2	.2	.1	*	*	*	*
3		.2	1.7	2.5	2.1	.2	*	1.0	.3	.5
4		*	*	3.7	.6	.1	*	8.0	.3	2.0
5		*	*	3.7	24.3	.6	.1	.5	.8	1.6
6		*		.2	.3	1.1	*	.6	.2	.4
7			*	.1	.1	*	.2	.1	*	.1
8		.3	5.9	2.4	1.5	.3	.1	9.9	.2	.7
9		.1	.7	.3	.8	.1	*	*	5.3	.4
10		*	.1	1.7	1.7	.3	.1	1.1	.5	6.6
Percent		.7	8.5	14.7	31.6	2.8	.6	21.3	7.7	12.1

*Values less than .1 percent are not specified in Tables 20 through 29. This rounding of all numbers to the nearest .1 percent accounts for cases where the sum of the cell percentages in each column does not exactly match the column total or the matrix total does not exactly equal 100 percent.

Table 21

Grand Matrix for Group C (Comparison Group)
without Pre-Service Instruction in FIAC

Category	1	2	3	4	5	6	7	8	9	10
1										
2		*	.1	.2	.1	.1	*	.1	*	*
3		.1	.8	1.6	1.6	.2	*	.5	.3	.3
4		*	*	2.9	.7	.2	*	6.1	.2	1.7
5		*	*	3.3	27.5	.6	.1	.6	.8	1.5
6		*	*	.3	.3	1.6	*	.6	.3	.5
7		*	*	.1	.1	*	.4	*	*	.1
8		.4	4.0	1.7	1.6	.3	.1	11.7	.2	.7
9		.1	.5	.3	.9	.1	*	*	5.9	.4
10		*	*	1.4	1.7	.4	.2	1.0	.5	9.3
Percent		.7	5.4	11.8	34.5	3.5	.8	20.6	8.2	14.5

*Value less than .1 percent

Table 22

Student Teachers - Subgroup A0

Category	1	2	3	4	5	6	7	8	9	10
1										
2		.1	.1	.2	.2	.1	*	.1	*	.1
3		.1	2.2	2.9	1.5	.2	*	1.1	.2	.6
4			*	4.4	.7	.1	*	8.3	.2	1.9
5		.1	*	3.2	22.3	.6	.1	.8	.4	1.3
6				.2	.2	1.5	*	.7	.3	.5
7				.1	.2	*	.8	.1	.1	.2
8		.4	6.0	2.6	1.7	.3	.2	8.9	.1	.6
9		.2	.3	.1	.5	.1	.1	*	2.7	.2
10		*	.1	1.9	1.6	.4	.2	.9	.3	10.5
Percent		.9	8.8	15.6	28.8	3.4	1.5	20.8	4.3	15.9

*Value less than .1 percent

Table 23

Student Teachers - Subgroup C0

Category	1	2	3	4	5	6	7	8	9	10
1										
2		*	*	.4	.1	.2	*	.1	.1	*
3		.1	.7	1.9	1.1	.3	*	.8	.3	.3
4		*		3.4	.7	.2	.1	6.4	.2	1.7
5		*	*	2.8	20.9	.6	.1	.5	.5	1.8
6		*	*	.3	.3	2.1	*	.8	.5	.6
7		*	*	.2	.1	*	.6	.1	.1	.2
8		.6	4.1	2.1	1.5	.5	.1	12.5	.2	.7
9		.1	.6	.2	.6	.2	.1	*	4.4	.7
'0		*	.1	1.5	2.0	.5	.3	1.0	.7	12.4
Percent		.9	5.6	12.7	27.3	4.6	1.4	22.3	6.9	18.4

*Value less than .1 percent

Table 24

First Year Teachers - Subgroup A1

Category	1	2	3	4	5	6	7	8	9	10
1										
2		*	.1	.2	.2	.1	*	*	.1	*
3		.3	1.4	3.0	2.3	.4	*	1.0	.4	.6
4		*	*	3.2	.5	.1	*	9.0	.5	2.3
5		*	*	3.9	19.0	.6	*	.6	.9	1.8
6		*		.2	.3	.9	*	1.1	.1	.4
7			*	.1	*	*	*	.2	*	*
8		.3	6.9	2.6	1.9	.5	.2	11.4	.2	.7
9		.1	.8	.4	.9	.1	*		3.6	.3
10		*	.1	1.9	1.7	.4	.1	1.4	.5	6.9
Percent		.8	9.4	15.6	26.9	3.0	.4	24.7	6.2	13.1

*Value less than .1 percent

Table 25

First Year Teachers - Subgroup C1

Category	1	2	3	4	5	6	7	8	9	10
1										
2		.1	.1	.2	.1	*	*	*	*	*
3		.1	1.0	2.2	1.6	.2	*	.4	.2	.5
4			*	3.3	.8	.2	*	6.9	.2	1.5
5		*	*	3.6	26.8	.7	.1	.6	.7	1.4
6		*		.2	.3	2.8	*	.6	.3	.6
7			*	.1	.1	*	.3	*	*	.1
8		.3	4.8	1.6	1.7	.3	.1	11.5	.2	.7
9		*	.4	.2	1.0	*		.1	3.3	.2
10		*	*	1.6	1.6	.5	.1	1.0	.3	8.9
Percent		.6	6.3	13.0	34.0	4.8	.7	21.2	5.3	14.1

*Value less than .1 percent

Table 26

Second Year Teachers - Subgroup A2

Category	1	2	3	4	5	6	7	8	9	10
1										
2		.1	.1	.2	.2	*		.1	*	.1
3		.3	1.1	2.1	2.3	.1	*	.3	.2	.4
4			*	3.9	.5	*	*	7.7	.3	2.1
5		.1	.1	3.8	29.7	.6	.1	.2	1.0	2.1
6		*		.1	.3	1.2	*	.2	.1	.3
7				.1	.1	*	.2	*	*	.1
8		.2	5.0	2.3	1.3	.1	.1	8.6	.1	.7
9		*	.6	.2	1.1	.1	*		4.1	.5
10		*	.1	1.9	2.2	.2	.1	1.1	.7	6.3
Percent		.7	6.9	14.6	37.7	2.3	.5	18.3	6.5	12.5

*Value less than .1 percent

Table 27

Second Year Teachers - Subgroup C 2

Category	1	2	3	4	5	6	7	8	9	10
1										
2		.1	.1	.2	.2	.1		*	*	.1
3		.2	.5	1.4	2.2	.1	*	.3	.3	.4
4			*	2.4	.6	.1	*	5.9	.1	1.8
5		*	*	3.5	30.9	.6	*	.3	1.2	1.5
6		*		.2	.3	.8	*	.6	.1	.4
7				.1	.1	*	.2	*	*	.1
8		.4	4.0	1.5	1.3	.1	*	10.1	.2	.7
9		.1	.6	.3	1.0	.1	*	*	6.2	.4
10		*	*	1.4	1.7	.3	.2	1.1	.6	9.7
Percent		.7	5.3	10.9	38.2	2.4	.5	18.3	8.7	15.0

*Value less than .1 percent

Table 28

Third Year Teachers - Subgroup A3

Category	1	2	3	4	5	6	7	8	9	10
1										
2			*	.1	.1	*		*	*	
3		*	2.5	1.8	2.2	.2		2.1	.4	.3
4			*	3.3	.9	.2		6.6	.3	1.2
5		.1	*	3.6	26.1	.4	*	.6	.6	.5
6				.2	.2	.8		.5	.4	.2
7				*	*		.1	*	*	*
8		.2	5.6	2.1	1.2	.4	*	10.8	.5	.6
9		*	1.1	.3	.5	.2		*	13.3	.4
10			.2	1.0	.7	.1	*	.8	.4	2.4
Percent		.3	9.6	12.6	31.9	2.5	.2	21.5	15.9	5.6

*Value less than .1 percent

Table 29

Third Year Teachers - Subgroup C3

Category	1	2	3	4	5	6	7	8	9	10
1										
2		*	*	.2	.1	*		.1	.1	*
3		.1	.9	1.1	1.4	.1	*	.6	.2	.2
4		*	*	2.8	.7	.2	*	5.5	.2	1.6
5		*	*	3.3	30.4	.6	*	.8	.8	1.3
6				.3	.3	1.1	*	.4	.3	.5
7				.1	.1	*	.4	*	.1	.1
8		.3	3.2	1.7	2.0	.3	*	12.9	.3	.6
9		.1	.5	.4	.9	.2	.1	*	8.6	.2
10		*	*	1.1	1.5	.4	.2	.9	.4	6.2
Percent		.5	4.7	11.0	37.3	3.0	.8	21.2	10.8	10.6

*Value less than .1 percent

BIOGRAPHICAL SKETCH

Eldon Cale Smith was born in Casa Grande, Arizona on August 24, 1943. After receiving his elementary education in Casa Grande and Taft, California, he completed his secondary education in the public schools at Tempe, Arizona. After graduation from Arizona State University in 1965 with a Bachelor of Arts degree in Political Science, he served six months on the staff of the Arizona State University VISTA Training Project. Upon completion of his Master of Arts degree in Political Science in 1966, he taught social studies at McClintock High School in Tempe. After serving in the United States Army as a communications instructor, he returned to Arizona State University in 1969 to continue graduate studies. In January of 1970, he joined the faculty of Peru State College, Peru, Nebraska to administer a statewide extension program providing college courses to Head Start staff. During the fall of 1972, he taught curriculum courses as a Graduate Associate in Secondary Education at Arizona State University. In 1973 he married Nadine Chance of Tempe. He is currently a government teacher at Marcos de Niza High School in Tempe. He is a member of Phi Delta Kappa and the National Education Association.